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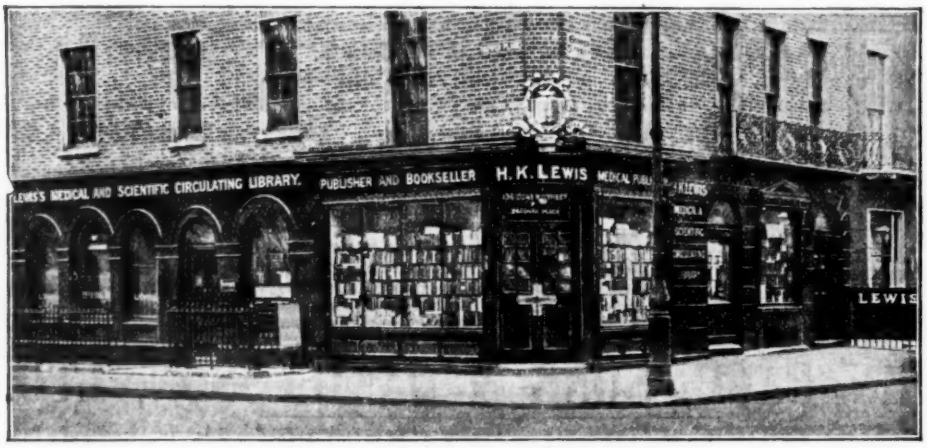

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A Lecture

ON

THE PREVENTION AND ARREST OF LICE-BORNE DISEASES BY NEW METHODS OF DISINFECTION.

Delivered before the Royal Society of Medicine on July 17th, 1918.

BY COLONEL WILLIAM HUNTER, C.B., A.M.S.,

PRESIDENT OF THE ADVISORY COMMITTEE FOR PREVENTION OF EPIDEMIC DISEASES IN EASTERN WAR AREAS, 1915–1917; COLONEL IN CHARGE OF BRITISH MILITARY SANITARY MISSION TO SERBIA, 1915; CONSULTING PHYSICIAN TO THE EASTERN COMMAND.

INTRODUCTORY.

THE subject of this lecture relates to the prevention of lice-borne diseases—typhus, relapsing fever, and trench fever. I am not concerned with the evidence as to the lice-borne character of these diseases, nor with the life habits of lice, nor with the degrees of heat required to kill them, but I have been greatly concerned with killing them in masses by an overwhelming amount of steam in the presence of which all life is impossible. My interest has been not in costly and complicated appliances for disinfecting—usually not available when and where they are required and insufficient to meet the needs when they are—but in simple methods, available at all times and absolutely efficacious in killing body vermin, easily improvised, easily worked, extremely effective, the very "Columbus egg of simplicity and efficiency," as they were described by one enthusiastic Serbian official. This interest, born of a great necessity, in dealing with the appalling conditions I had to face in Serbia in 1915, has given the subject of disinfection a new importance in my eyes, and it has been my experience to extend that interest to conditions prevailing in Eastern war areas.

These results have been from time to time officially recorded in reports submitted from the Serbian and Eastern Mediterranean war areas, where my duties for two and a half years have lain—first as O.C. of the British Military Sanitary Mission of 25 R.A.M.C. officers sent out to Serbia in February, 1915; and subsequently from July, 1915, to June, 1917, as President of the Advisory Committee for Prevention of Epidemic Diseases in all the Eastern war areas. These duties throughout have related to preventive work against all infectious diseases, among which lice-borne diseases have been among the most prominent and difficult to deal with.

The origination of two new types of disinfectors, called the "barrel disinfector" and the "railway van disinfector" respectively, was the first work of the British Military Sanitary Mission sent out, at the request of the Serbian Government, at two days' notice and under the most urgent circumstances, by the War Office on Feb. 15th, 1915, under my charge, to deal with the great epidemics of typhus and relapsing fever and typhoid fever then raging in that country.

On our arrival we found that the whole country was ravaged by these infections without any available measures for disinfection or equipment, even in the largest hospitals, to meet the urgent conditions. The barrel disinfector was devised by my colleague, Lieutenant-Colonel G. F. Stammers, R.A.M.C., on March 7th, three days after our arrival in Nish, and was set up and put into use the following week in Kragujevatz, the headquarters of the Serbian Army.

The railway van disinfector was devised by the same officer about ten days later to meet the needs of disinfection of troops on a larger scale, and to form a part of the *British Sanitary Train for Inoculation and Disinfection*, which we had decided to form for the work of the mission.

DISINFECTION ON THE LARGEST SCALE BY RAILWAY VAN DISINFECTORS.

The principle of primary importance in connexion with disinfection against lice-borne diseases is the necessity of carrying out disinfection on the *largest possible scale* and in the *shortest period of time*—the object in view being in any individual unit to kill off within a period of a few days every living thing in the clothes and on the body that may have possibly contracted infection and be capable of conveying such infection.

This principle is carried out—with a rapidity and efficiency unapproached by any other method of disinfection—by the current steam railway van disinfector. Simple and eminently practical, this type of disinfector, originally devised as above stated, was first put into use in Serbia. It was subsequently introduced under my direct personal supervision in Egypt in February, 1916, with modifications which added seven- to ten-fold to its working capacity and rapidity of action. The results were closely watched all the time till I left Egypt in June, 1917.[1]

The van disinfector both in principle and efficiency is totally different from other various contrivances—e.g., steam pressure boilers *on* trucks ("truck-disinfectors")—which have been put into use on railways for purposes of disinfection. The principle of its action is disinfection *by current steam*, supplied by and directly discharged in greatest volume and force into one or two ordinary railway vans (suitably adapted) by the railway engine, which conveys them along the line to the place most conveniently adjacent to the troops. (Figs. 1–3.) The cost of adaptation is only £30 to £40, the working of it simple and easy.

There is, of course, nothing new in the principle of using current steam as a disinfecting agent. What is new, and what I claim to the credit of the English Sanitary Mission in Serbia, is the application of this principle for purposes of widespread disinfection by new methods and on a larger scale than had ever before been devised.

Rapidity of Disinfecting Action.

The working capacity of the railway van disinfector here described is very large, and the arrangements simple to carry out, as shown in Figs. 4 and 5.

Each double van is capable, from my personal knowledge and observation, *if fully employed*, of carrying out disinfections at the rate of 500 kits with 1000 blankets and 500 overcoats every 2 hours; of 2000 kits with 4000 blankets and 2000 overcoats in a day of 8 hours; of disinfecting over 10,000 kits with 20,000 blankets and 10,000 overcoats in 4 days; and 18,000 kits with 36,000 blankets and 18,000 overcoats in 9 days.

With one disinfector alone I have disinfected the kits and blankets of a hospital with 1000 beds in 4 hours; the kits, blankets, and camp bedding of 4000 prisoners of war in 16 hours; of 1500 camel corps men in about 12 hours.

Divisions of troops can be dealt with at the following rate: 8000 men in 4 days, 15,000 in 12 days (3800 of these being done in one day); of 16,000 in 12 days; 10,000 in 4 days; and 18,000 in 10 days.

As regards *ordnance clothing*, this can be disinfected, in sackfuls at a time, at the rate of many thousands of articles every 2 hours, tens of thousands daily, and hundreds of thousands weekly.

A most striking illustration of the advantages of this rapidity was afforded in one instance, where a van disinfector which had just disinfected a division of 18,000 troops in 12 days in one area went off about 500 miles to a centre in Southern Europe, where some cases of typhus had occurred among the native labourers. It disinfected the whole of the troops and labourers (1500 in number) in three days, and was back at work again in its former area disinfecting another division on the fourth day.

In the first three months of their work the two van disinfectors carried out the disinfection of 170,000 kits, 170,000 overcoats, 340,000 blankets, and great masses of ordnance clothing. Since that time the disinfectorr in use have been the most prominent and effective measure of preventive work in Egypt, each double van disinfector being capable of carrying out in the simplest and most efficient way in all parts of the war area—up to railhead—disinfection of troops and native labourers to the number of 60,000 men monthly. The total number of disinfections carried out in 12 months (May, 1916, to April, 1917) among a monthly average of 40,000 labourers was 495,000—an average of over 40,000 a month.

This rapidity of work does not apply to all railway van disinfectors as such, but only to the original Stammers's van disinfector as modified by me in Egypt (Cairo Van 5511). The feature of this latter form is that the volume and force of steam are so great, and its method of dispersion

[1] The circumstances there did not permit any definite information to be furnished regarding its working capacity before the Mission left Serbia early in June, 1915.

from the pipes so arranged that it is possible (for the first time in the history of disinfection) to disinfect bundles of clothing in bulk without unpacking or spreading them out. The advantage of this in connexion with disinfection against lice-borne diseases is obvious, since it permits clothes to be disinfected without any handling of individual articles.

Comparison of Working Capacity of Double Van Disinfectors with Other Types of Disinfectors in Army Use.

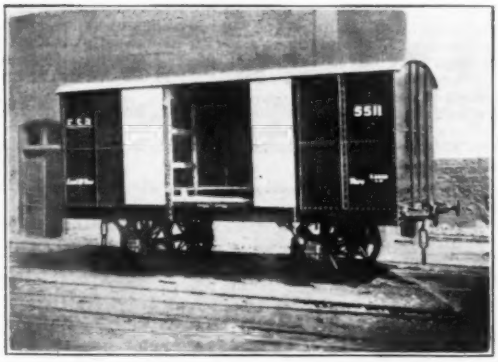
The working capacity in two hours' time of the double van disinfector as compared with that of all the chief types of disinfectors in use in the Army is indicated graphically in Chart 1 for (*a*) blankets, (*b*) kits (exclusive of overcoats) respectively. The figures for the other types of disinfectors are those officially given in "Notes for Sanitary Officers, B.E.F., France, 1917" (W.O., 1918), p. 42.

TABLE I.—*Two Hours' Working Capacity. (Time Required to Load, Disinfect, Dry and Unload.)*

Type of disinfector.	No. of load.	No. of blankets.	No. of "kits."*
A. Portable steam disinfector	2	16	12
B. Newman steam and formalin ...	2	20	12
C. Thresh portable	2	60	40
D. Thresh fixed	2	80	60
E. Thresh on Foden lorry (2 chambers)	2	240	140
F. Lyon portable M.O.	2	120	70
G. Lyon fixed M.O.	2	120	70
H. Lyon fixed L.O.	2	260	120
I. Lyon No. 2 D.	2	120	70
K. Lyon No. 13	4	40	32
L. *Double van Disinfector (Cairo van 5511)*	1	1500	500†

* Exclusive of overcoats. † + 1000 blankets + 500 overcoats.

FIG. 2.



A unit of the van disinfector (Cairo Van 5511) with doors wide open to show the internal adaptation.

TABLE II.

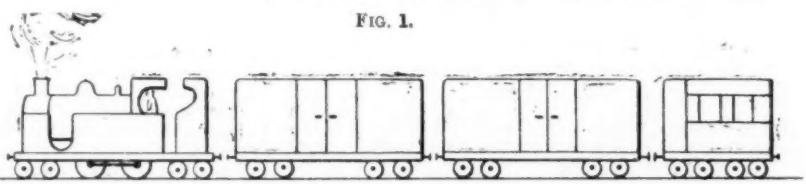
—	First 7 days (one van).	First 4 days (double van).	First 3 months	First 12 months.*
No. of days	7	4	101	—
No. of hours' use of steam	22	24	—	—
No. of troops disinfected	2400	5,850	170,000	495,000
No. of kits	2400	5,850	170,000	495,000
No. of blankets	5370	10,500	341,000	493,000
No. of overcoats	1631	3,500	168,000	?
Ordnance clothing	62 sacks.	3,500†	‡	?

* Average of 40,000 labourers. † Sleeping mats. ‡ Large masses.

The double van disinfector can deal with 500 men at a time. It was found to work with absolute uniformity, the exposure given being an hour for van full up with kits, and 15 minutes for the overcoats, which were thrown in loosely. Many of the kits were extremely lousy when collected, and examination showed that in every case all the lice and their eggs were dead and shrivelled up after disinfection in the van.

The results of the first eleven days' and first three months' work of the two disinfectors, the records of which were carefully kept, are shown in Table II., while the scale on which kits, overcoats, and blankets were dealt with from day to day during the first three months by two van disinfectors is graphically shown in Chart 2.

FIG. 1.



The current steam railway van disinfector as introduced into Egypt in 1916.

RELAPSING FEVER AMONG NATIVES IN EGYPT.

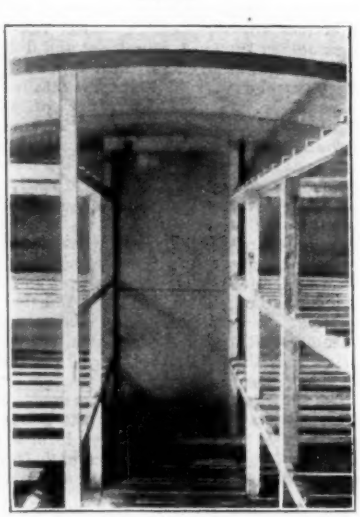
The course of events may here be briefly summarised in a narrative form.

Being satisfied from my previous experience in Serbia in 1915 that the available means of disinfection were altogether inadequate to meet even a moderate incidence of relapsing fever, I suggested that the circumstances of an outbreak of relapsing fever among the native labourers in Egypt could best be met there also by the use of the railway van disinfector.

I submitted my proposals, and got permission to form the type of van disinfector I suggested. It was formed in the railway works at Cairo from a steel van and old engine which I selected and found available. The work was most expeditiously and thoroughly carried out. The adaptations, which were made in four days, included, in addition to other modifications, the use of a small railway engine for the combined purposes of locomotion and production of steam, instead of a small heating engine employed in Serbia, and proved on the first trial by me two days later to add enormously to the rapidity of action and efficiency of the van as a disinfector.

They enabled me to dispense with all the delay inseparable from unpacking, spreading out, and repacking of the clothes disinfected. This adaptation made it possible for the steam to penetrate in great volume and force into the centre of even the largest bundles of clothes. This was proved by numerous tests — eggs being boiled hard, potatoes cooked, cultures sterilised, flies enclosed in test-tubes killed, and, most conclusive of all, a self-registering thermometer — even when enclosed in its case — closed in at both ends and put into the centre of the largest bundle, registering temperatures of 102° to 105° C. (215° to 220° F.) as early as half an hour after the steam was turned on from the engine into the van.

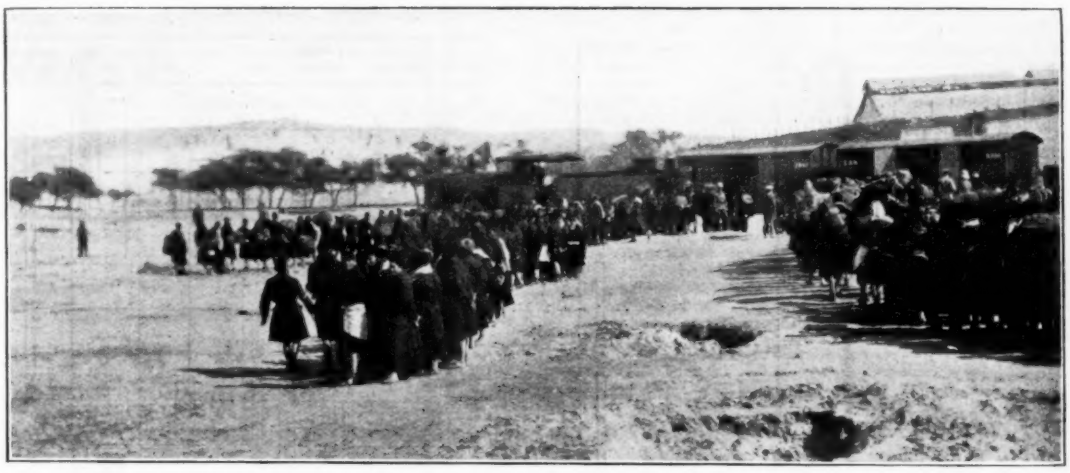
FIG. 3.



Interior view of the same van.

I spent the first fortnight in testing its working in all classes of work in which it could be required, and in each and every direction the results obtained exceeded expectations.

FIG. 4.



The double van steam railway disinfector in use in Egypt. Two queues, each of 250 men, are seen approaching to deposit their infected kits in the vans. The disinfection was completed in one hour, the overcoats in 15 minutes, the men were bathed, and the whole process was completed in two hours. 2000 men were dealt with on this day in the course of eight hours.

Four other similar disinfectors with double vans were subsequently formed.

Efficacy of Van Disinfectors in Prevention of Relapsing Fever.

A study of the results obtained in Egypt showed the closest relationship to exist between the incidence of the disease and the amount of disinfection carried out in the unit affected. If the disinfection can be carried out rapidly in the whole of the unit the disease is thoroughly arrested.

Place A.—In this place the outbreak was the first to occur and the sharpest. This was the first place I disinfected with the van disinfector (Feb. 25–27th, 1916). I made it a test disinfection. The kits and blankets of 485 labourers (viz., 485 kits, 485 blankets, and 333 overcoats) were thoroughly disinfected. The men all bathed during the disinfection; the heads of some 50 men were shaved; and then finally to complete the disinfection I had every single article of clothing or bedding found in their tents collected in large sacks, brought to the disinfector, and thoroughly disinfected. The time taken for the whole process was 5 hours.

At the same time I disinfected completely (in 6 hours) 347 kits, 195 overcoats, and 694 blankets of the unit in which the relapsing fever cases had occurred; 80 kits and 1057 blankets of the field ambulance and the stationary hospital concerned in dealing with these cases (in 3 hours); and finally 62 large sacks (two full van loads) of ordnance clothing (in 4 hours).

The result of the first seven days' work served to establish conclusively its exceptional merits and efficiency. I asked that another one should be formed, with two vans attached instead of one. This was immediately done, and completed as before in a week's time; I found it ready in the railway works in Cairo on my return on Saturday, March 18th.

It was arranged that it should be sent the following morning to a siding adjacent to a large hospital, where I carried out the disinfection of 850 large hospital kits in two fillings of the vans in the course of 4 hours; and of 500 camel drivers in the afternoon; of 1800 camel drivers the following day; and of 3500 Turkish prisoners on two following days.

The sequel to the disinfection—of an exceptionally complete character carried out at Place A—was complete arrest of infection. Only three cases occurred in the next 12 months instead of over 50 in the month when the disinfection was carried out.

Place B.—The course of events in this place was also most interesting. This was the seat of the largest labourer camps, the number up to December, 1916, averaging 3000–4000 men. The monthly incidence of the disease in the first months of 1916 was very high, amounting in April and May to 6·68 and 6·15 per cent. of the number of labourers. Up to May no disinfections were carried out, but from May onwards a steadily increasing disinfection was commenced and continued throughout the year.

From July onwards the whole of the labourers were being disinfected at least once, and from August onwards two or three, and sometimes four, times a month.

The disease was practically stamped out; the incidence during the following winter was only 16 cases instead of 530 cases in three months of the preceding year, rising only once to 0·39 per cent., at a time when elsewhere it was as high as 8·35 per cent.

If the whole of the unit cannot be disinfected within at most 2–3 weeks (i.e., the incubation period of lice-borne diseases), then the disease continues to occur, although lessened in incidence, men becoming reinfected with infected lice from those who have not been disinfected.

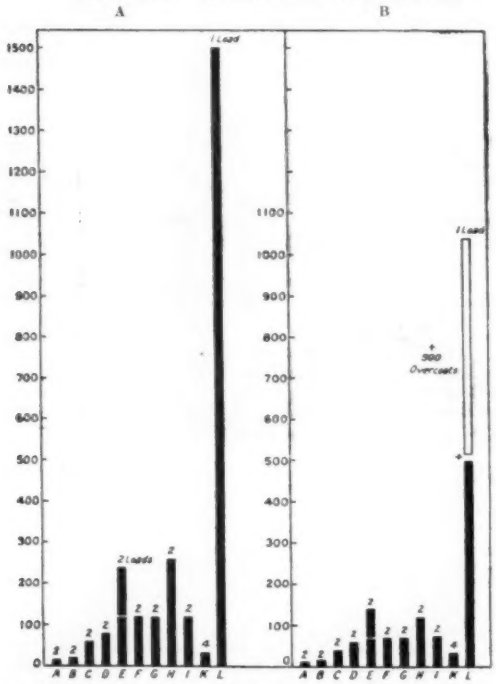
This is the prime reason why hitherto lice-borne diseases have continued to propagate themselves for a certain, and sometimes (e.g., trench fever) indefinite, period, apparently in

FIG. 5.

Part of the same queue as in Fig. 4 showing the bundles of infected clothing which are placed unopened in the van. The large size of the bundles is shown.

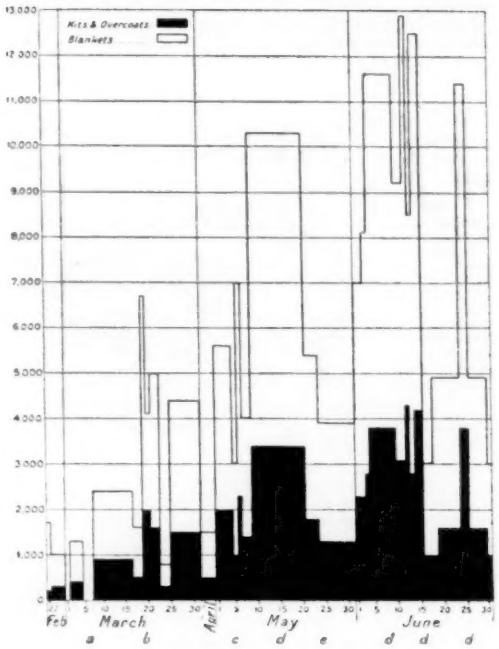
CHART 1.

A, Blankets. B, Kits, exclusive of overcoats.



A graphic illustration of the large capacity of the van disinfector compared with other types. (See Table I. for key to lettering.)

CHART 2.



A graphic record of the achievement from week to week of a double van disinfector.

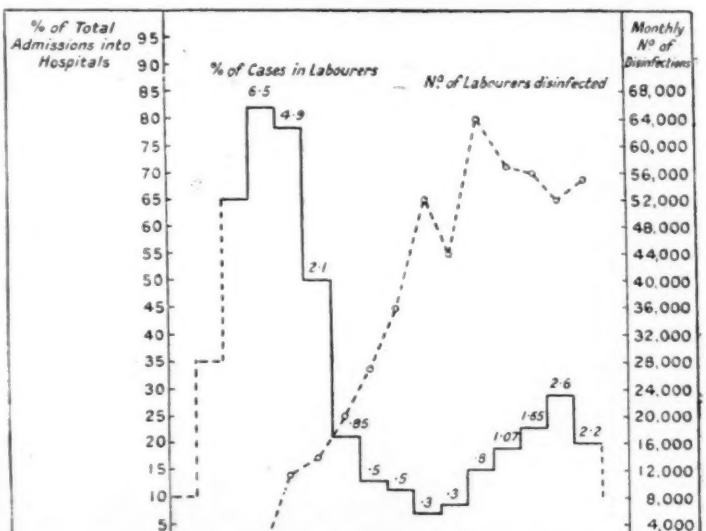
spite of what may be an amount of disinfection absolutely large, but quite insufficient to cover the whole of the affected unit within the incubation period of the infection.

The above conclusion is well illustrated by a study of the incidence of relapsing fever in labourers' camps in Egypt, of which the following is a sample.

Place C.—One of the largest and most important labourers' camps was at Place C, an important railway junction of the Egyptian railways. The incidence in this group early in 1916, before disinfection was commenced, was high—viz., 10 per cent. in April and 4 per cent. in May. When disinfections were commenced in June they did not cover in any month all the labourers in camp up till December. The result was that although the incidence fell it was never entirely arrested, and it rose again as high as 4·5 per cent. the following winter.

It is to be noted that, although inadequate when commenced in arresting the incidence, the actual amount of disinfection in the following five months (June to November) was considerable. In terms of what has hitherto been considered possible, it might even be deemed satisfactory—viz., 3000 to 8000 men monthly—averaging 4000 in a body of men averaging about 6000. It represents a daily average of about 130 men—approximately the steady work of two portable Threshes. Nevertheless, it did not suffice to check the disease for the reason which I emphasise—viz., that disinfection to be effective in arresting a louse-borne disease in any area should be capable of being applied to the whole of the individuals in that area within a maximum period of 2-3 weeks; and if the infection be severe within a shorter period of one week, and repeated, if necessary, a week or ten days later.

CHART 3.



Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Nº of Labourers	20,000	20,000	20,000	20,000	21,000	28,000	29,000	32,000	35,000	38,000	44,000	46,000	51,000	50,000	54,000	50,000	-
Nº of Cases	50	400	1,000	1,324	1,044	592	241	172	185	119	152	401	553	839	1,442	1,132	-
% of Labourers	-	-	1·0	6·5	4·9	2·1	·85	·53	·52	·31	·32	·82	1·07	1·65	2·6	2·2	
% of Total Admissions	-	-	66	82	78	50	22	13	12	7	8	16	19	24	29	20	
Nº of Disinfections	0	0	0	0	12,000	14,000	19,400	21,000	35,000	53,000	64,000	58,000	57,000	53,000	58,000		
% of Labourers	-	-	-	-	57	50	68	84	103	140	100	133	113	114	98	112	

Incidence of relapsing fever among labourers and its control by disinfection.

In the case of groups numbering as many as 6000 to 8000 men this requirement may seem a counsel of perfection—desirable, perhaps, but not practically obtainable under military conditions. This is no longer the case; for, by use of the railway van, disinfection can be carried out on an almost unlimited scale. Such numbers can be dealt with in 4 or 5 days.

TABLE III.—*Place C.*

Month.	No. of natives.	No. of cases.	Per cent. of natives.	Per cent. of hospital admissions.	No. of disinfections.	Per cent. of labourers.
1916						
January ...	"	"	"	"	—	—
February ...	"	"	"	"	—	—
March	"	"	"	60	—	—
April	2963	309	10·43	83	—	—
May	4308	196	4·53	64	—	—
June	3864	120	3·11	34	2,749	71
July	3464	100	2·86	31	—	—
August ...	5876	56	0·96	12	3,305	56
September ..	6082	80	1·31	17	4,286	70
October ...	7601	64	0·84	13	8,023	105
November ...	9254	97	1·05	18	6,126	66
December ...	8495	195	2·29	35	10,834	127
1917						
January ...	8094	274	3·38	37	11,116	136
February ...	8347	215	2·58	36	7,837	93
March	8946	343	3·83	48	16,379	180
April	8737	443	4·56	41	25,011	280

The incidence of relapsing fevers in other groups of labourers in the area illustrates the same points.

Summary of Results in Egypt.

The sequel showed the following results:—

(*a*) The incidence was very effectively controlled by the amount of disinfection which it proved possible to carry out by means of van disinfectors among the natives, and its threatened incidence among the troops was immediately checked and controlled. (Chart 3.)

(*b*) The incidence among the *natives*, which when at its height, affected 6·5 per cent. of the labourers in any one month, never exceeded 2·6 per cent. in any one month in the following winter.

(*c*) Instead of constituting, when at its height, as much as 82 per cent. of the total admissions into hospital in any one month, it did not in any month exceed 30 per cent. (Chart 3.)

(*d*) Instead of affecting in any one month as many as 15 per cent. of the labourers in any one locality, it remained in nearly all places on a very low level—below 1 per cent. In only two places did it exceed 5 per cent., and even in these cases the incidence was at once checked by the extra and immediate disinfection which it was possible to bring to bear by means of the van disinfector.

(*e*) Its spread to the *troops* was effectively prevented or controlled.

The total number of cases among them in the four months (March to June) following the introduction of the van disinfectors in February, 1916, was only 143—all cases then ceasing.

Although this incidence was a small and satisfactory one, having regard to the large number of troops and the presence amongst them of so many cases of relapsing fever among the native labourers, the number appeared to me to be relatively large, in view of the exceptionally large amount of disinfection that had been carried out among the troops during this period.

I therefore made a close analysis of the cases, ascertaining in each case the place and date of their reporting sick, whether in the Northern Section van, where van disinfectors had been chiefly at work (over 150,000 disinfections), or in the Southern Section where the van disinfectors had been little in use (only 7000 disinfections).

The interesting result that appeared was that out of the total 143 cases that had occurred—March to June—only 30 had occurred in the Northern Section among its large

	Natives.		Troops.	
	% of total number.	% of total cases.	% of total troops.	% of total cases.
Northern Section ...	60·0	50·0	80·0	20·0
Southern Section ...	40·0	46·0	20·0	80·0

number of troops (80 per cent. of the total troops), whereas no fewer than 113 cases had occurred in the Southern Section among its small number of troops (less than 20 per cent. of the total troops.)

There was thus a marked difference between the spread of the disease to the troops in the Northern and Southern Sections respectively.

(*f*) In the Southern Section reliance had been placed on the large disinfecting station at Place F to carry out the disinfection necessary in its neighbourhood. Nevertheless, the number of cases among the troops at this place was the largest in any place, totalling 91 cases out of the total of 113 cases in this Southern Section.

The official data regarding the amount of disinfection carried out by this large disinfecting station, equipped with four of the largest steam-pressure boilers, show that the total number of troops disinfected was about 32,000 in the six months, a number which one double van disinfector (Cairo Van 5511) is capable of disinfecting, as shown on more than one occasion, in 14–21 days—e.g., 10,000 in 4 days, 18,000 in 9 days, 3800 in 1 day—a total of 31,800 in 14 days.

While stationary disinfectors can only be used for those in their neighbourhood, the van disinfector can carry out this large number of disinfections daily over an area of 100 miles or more whenever and wherever they are required.

LICE-BORNE INFECTION AMONG TROOPS IN THE FIELD.

It is clear from the foregoing that to deal effectively with such conditions the disinfection must be capable of being brought to the troops, so as to be accessible to them wherever they are; it must be capable of dealing with them rapidly and in great numbers at a time, in order to interfere as little as possible with military duties; and be easily improvised on the spot and capable of being easily and expeditiously worked without need of special knowledge or technique or special personnel.

All these requirements are in my experience met—in a manner unapproached by any other type of disinfector—by the van disinfector (Cairo). Looking back at the circumstances in the Egyptian war area and on the results which I followed for a year and a half, I feel satisfied that in the absence of this form of disinfector the problem of relapsing fever in the war area would have occasioned military difficulty and materially impeded the prosecution of the campaign. Before the introduction of the van disinfectors among the natives nearly one-fifth of the average number of labourers were attacked by relapsing fever, but by disinfection on the largest scale by this disinfector the disease was effectively arrested or stamped out or controlled.

(To be concluded.)

THE RÔLE OF THE SCAPULA IN THORACOPLASTY.

BY JOSEPH E. ADAMS, M.S. LOND., F.R.C.S. ENG.,
CAPTAIN, R.A.M.C. (T.); SURGEON WITH CHARGE OF OUT-PATIENTS TO ST. THOMAS'S HOSPITAL, ETC.

SOME ten years ago I performed an extensive thoracoplasty on a man, aged 21, who had a left-sided empyema containing no less than 10 pints of pus, drained for several weeks without any evidence of expansion of the lung or any sign of the displaced heart returning to its proper place. He was exhibited before the Royal Society of Medicine in January, 1910,[1] 18 months after operation, in a very good state of health, with very little deformity beyond flattening of the chest on the affected side, and physical signs pointing to the existence of a healthy lung on this side of rather more than half the normal size.

I was congratulated on the very satisfactory result, which those present appeared to attribute to the fact that the plastic operation was performed six weeks after the original drainage of the pleural cavity and the consequent expansion of the lung before the visceral pleura became very thick. Personally, I do not think this good result would have been obtained if the chest wall had been "allowed to fall in," as is usually said in text-books to be the object of a thoracoplasty, and I attributed it to the use of the scapular muscles to obliterate part of the cavity, to pull up the diaphragm, and to pull on the lung by movements of the arm, when the scapula was made to occupy the place of the excised ribs. Recent experience has confirmed my opinion, and it seems to me that hardly any case of old-standing empyema is likely to resist surgical intervention provided a proper use of the scapula and the muscles attached to it is made and every

[1] Transactions of the Royal Society of Medicine, Clinical Section, January, 1910.

effort is directed towards closure of the chest at the operation. The whole secret of success in recent war surgery of the chest has been shown to depend on the closure of the chest wall, and, if the expansibility of the lung remains, there is every prospect of complete cure even from severe lesions. I have recently operated along the same lines in the case of an empyema where another surgeon had operated twice and left a wide gaping wound after 15 months' treatment which showed no sign of closing. The first operation performed was decortication of the lung, and the second aimed at the division of adhesions between the parietal and thickened visceral pleura. Such operations are doomed to failure unless steps are taken to close the thoracic cavity, and this cannot be done by merely dissecting up skin flaps and bringing them across the mouth of the cavity; the lung will not expand if it lies exposed at the bottom of an open wound against atmospheric pressure, and my operative procedure aims at the closure of the cavity with muscle and the favouring of expansion of the lung both by active movements and conditions of intra-thoracic pressure.

Notes of Case: Description of Operation.

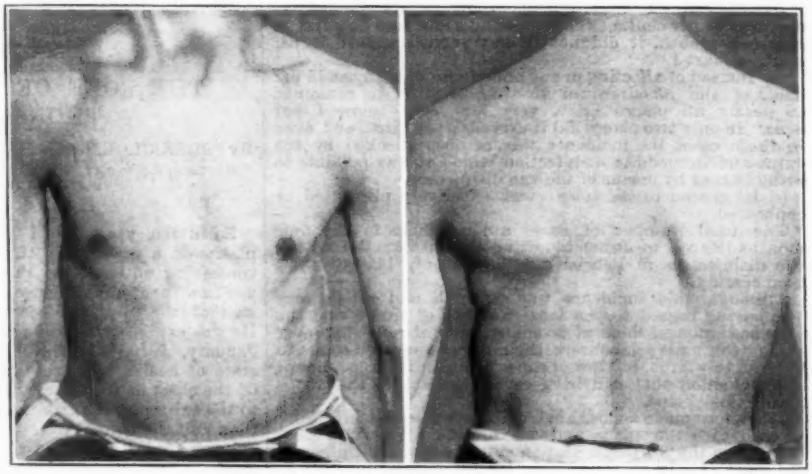
The notes of my case operated upon in 1908 are as follows:—

Patient, aged 21, a pale and thin man with marked respiratory distress, lying on his left side and perspiring freely. There was evidence of a total empyema on the left side; some tubular breath sounds were audible over the upper half of the lung, but they were absent over the lower half, and neither vocal fremitus nor resonance was conducted at all. There were no adventitious sounds. His respirations were 40 to the minute and the pulse-rate 120. The heart was displaced so far to the right that pulsation could be felt in the right axilla. Very shortly after admission the left side of the chest was aspirated, and seven pints of greenish-yellow, sweet-smelling pus were drawn off. Some few hours later two inches of the left seventh rib were resected just behind the mid-axillary line. Not less than three pints of pus escaped, some thickened fibrin was removed from the pleural cavity, and a drainage-tube just entering the pleura was fixed in the wound. From this pus the pneumococcus was grown in pure culture. The drainage of the empyema was satisfactory, taking into account the large size of the abscess cavity, and at the end of three weeks there was very little discharge. Four weeks after operation the heart was still displaced beyond the right border of the sternum, and there was very little evidence of function in the left lung. X ray examination revealed abnormal transparency of the left chest, with a thin strip of shadow, to the left of the median vertebral opacity, in which the collapsed lung lay.

At the request of the physician, Dr. T. D. Acland, I undertook a second operation to secure closure of the cavity and expansion of the lung. The patient was anæsthetised with chloroform and rolled over on to his right side. The left arm was pulled a short distance across the chest and a long incision, parallel to, and 1 inch behind, the vertebral border of the scapula, terminating in the original mid-axillary wound, was made down to the level of the ribs and intercostal muscles. This incision split the trapezius and the latissimus dorsi and the lower part of the rhomboideus major, leaving a large portion of them attached to the scapula. Portions of the sixth, seventh, eighth, and ninth ribs were then resected subperiosteally; 6 inches of the seventh and eighth being removed, 2½ inches of the ninth, and a smaller portion of the sixth rib. The intercostal muscles, periosteum of the ribs, and thickened parietal pleura were next cut away with scissors, and such vessels as bled were easily secured by underpinning with catgut sutures. There was very little loss of blood and the shock of this part of the operation, which is commonly supposed to be one of its dangers, was very slight. The resulting wound was an open trough, comprising the whole pleural cavity, with the shrunken lung at the bottom, lying close against the thoracic spine. The lung though shrunken was still expanding a little with inspiration and the visceral pleura was not greatly thickened.

The next step in the operation consisted in suturing the muscular flap attached to the scapula to the lower portion of the lung and the diaphragm, the visceral pleura being just thick enough to hold catgut stitches when lightly tied; the scapula was then pushed into the cavity so that it occupied approximately the place of the resected ribs, and the stumps of the trapezius and latissimus dorsi were freed from the overlying skin and sutured to the surface of the muscle attached to the vertebral border of the scapula. The object of this procedure was immediately to lessen the size of the pleural cavity and to secure for the lung a space, half the size of the original pleural cavity, which it might be able to fill when its expansion was aided by the movements of the left arm and the pull of the muscles passing from scapula to lung. The cavity was gently sponged out with saline, but it did not appear sufficiently clean to close without drainage; therefore, a large rubber tube was left in the wound, its upper end reaching to the bottom of the new pleural cavity and its lower end emerging through the skin incision at its lowest anterior limit. The rest of the skin incision was closed with interrupted salmon-gut stitches. If I had done this operation to-day I might have risked the infection and closed the wound completely (leaving a new-formed pleural cavity part of whose bony wall would be formed by the scapula, divided into the upper pneumothorax and a lower space occupied by muscle). There was a good deal of discharge for a few days and the patient complained of slight pain on respiration. His left arm, which was not anchored by the bandage, he declined to move to any extent as this caused considerable pain. In a few days the patient's condition was markedly improved and breath sounds were audible over the front of the left chest. A fortnight after the operation breath sounds could be well heard all over the front of the chest down to the level of the skin incision and at the back to within 1 inch of it; the heart had returned very nearly to its correct position, and a radiogram revealed a pulmonary shadow extending midway between the left sternal border and the outer chest wall; expansion of the lung could be seen on the fluorescent screen, but there was less than the normal amount of brightening of the lung on inspiration. The patient soon began to look fat and well and the amount of discharge steadily diminished. After five weeks in bed he was allowed to get up and he walked about the ward without any respiratory distress. The wound finally healed ten weeks from the time of operation and has never given any trouble since.

FIG. 1.



Condition 18 months after operation.

Subsequent Condition.

The condition 18 months after operation was as follows, the absence of any marked deformity of the chest being well shown in Fig. 1. There is some flattening of the left side of the chest and slight deviation of the dorsal spine with convexity of sixth to twelfth dorsal vertebræ to the left, presumably due to the pull of the scapula. The movements of the arm are perfectly free. The left chest is resonant from the apex to the site of the scar; breath sounds are normal in front as far down as the scar, and posteriorly down to 1 inch below this level; irregular breath

sounds can be heard as low as the eighth rib in front and a little way below the scar at the back. Vocal resonance and fremitus are both present. There is fair visible expansion of the upper part of the left chest on inspiration. No adventitious sounds. Skiagraphy shows equal movement of the diaphragm on both sides, but the left cupola is a little higher than the right. The right lung is seen from apex to upper border of the eleventh rib, the left lung from apex to upper border of ninth rib.

Examination on April 25th, 1918, revealed the same physical signs except that the right side of the chest was more developed, and therefore the relative sizes of the two sides of the chest showed to the disadvantage of the side which had been operated on. Auscultation and percussion gave the same results as in 1909, and the heart was in its

FIG. 2.

Radiogram showing the area of functional lung, the elevation of the left cupola of the diaphragm and the slight deviation of the spine with convexity to the left. Taken ten years after the operation.

normal position. The patient was up to his normal weight, and the only inconvenience was dyspnœa on exertion, and for this reason he had very properly been rejected by the recruiting board. X ray examination showed a bright lung equivalent to rather more than half that present on the right side. The left cupola of the diaphragm was the higher, and it rose obliquely towards the outer chest wall.

Fig. 2 is a radiogram of the chest taken ten years after operation, which shows a large proportion of active lung on the affected side and practically no deformity of the chest.

The recent case which I have operated upon on similar lines unfortunately died suddenly of endocarditis, but the post-mortem examination afforded an opportunity of ascertaining that this operative procedure had secured firm adhesions between the scapular muscles and the lower part of the lung and diaphragm; the lung itself was considerably more expanded than it had been at the time of operation.

A careful review of the literature of thoracoplasty reveals the fact that the scapula is usually regarded as an obstruction, and a partial resection of it is recommended by some authorities. In my view, however, the bone of the scapular body may be utilised to take the place of resected ribs, and its muscles may be of value in securing mobilisation of the lung and raising of the diaphragm, both essential factors in healing of these cases.

Devonshire-place, W.

HOSPITAL SUNDAY FUND AT BRISTOL.—£4166 have been raised in Bristol as the result of the Hospital Sunday collections; this amount exceeds all former records by more than £1000.

Mr. J. Wickett, of Redruth, Cornwall, has given 1000 guineas to the funds of the West Cornwall Miners' and Women's Hospital.

GUNSHOT WOUNDS OF THE KNEE-JOINT WITH SEPTIC ARTHRITIS.

BY ARTHUR NEVE, F.R.C.S. EDIN.,
MAJOR, R.A.M.C.; SURGICAL DIVISIONAL OFFICER, WAR HOSPITAL, DARTFORD.

No further evidence is now required that most knee-joints which have been perforated by bullets or severely wounded by shell fragments, with injuries of the bones, may be saved by timely measures. Much credit is due to the overseas surgeons who have worked out the various methods and the careful technique by which this is achieved.

Our concern in this country is not with such cases, which only need rest and massage to complete the cure, but with the critical and threatening cases arriving in convoys, it may be from 7 to 14 days after being wounded, in which signs of infective arthritis are already well marked. It is such cases which tax the judgment of the surgeon as to the compatibility of conservation of the limb with safety to life.

The articles[1] by Sir George Makins, Colonel Barling, and other surgeons now with the B.E.F. in France show that the importance of the subject has been recognised, and also that the infective cases with septic arthritis, especially when associated with bony damage, stand in a separate category of infinitely greater impending danger than the others. The figures point to the gravity of the infected cases, which are not totalled separately. On a total of 845 cases of knee-joints of all kinds operated upon, of which a large majority may well have been free from septic arthritis, the amputations were 19 per cent. and the deaths 8·5 per cent. Max Page on a total of 70 cases gives 25 as infected, amputations 10, deaths 5 = 20 per cent. mortality. Rankin gives 29 cases of excision with 8 deaths, but of these 3 were due to other complications; 3 others were finally amputated. These and other figures emphasise the seriousness of the condition when once sepsis develops.

The more recent convoys from France received at Dartford have shown many encouraging results from early operation in France, with excision of the wound, removal of foreign bodies, thorough cleansing of the joint, and primary suture. At the time of writing there are 10 healed cases in this hospital, not one suppurating and not one amputated for arthritis. A year ago similar injuries would have arrived here in a highly septic condition. We never amputate septic knees speedily after admission. If the man was passed by the surgeons abroad as fit for the journey and not requiring immediate amputation we may so far endorse their opinion as to carry on conservative treatment until he has got over any special exacerbation due to the transit.

Drainage.

Of late much has been written about the difficulties of drainage of the knee-joint, with all its bursæ and pouches. Some of us had been working at these problems long before the war.

The kernel of the question is how to obtain adequate *posterior* drainage, for the back of the joint is swathed in ligamentous and muscular structures, with interstitial bursæ and tendon sheaths, and in close contact with the posterior ligament is the popliteal artery. Obviously, any drainage-tube behind the crucial ligament would risk hæmorrhage. But postero-lateral incisions on both sides should be made to the synovial pouches behind the condyles by the method of Labey adopted by Campbell and Gill.[2] This is much simpler than Payr's method.

Anterior drainage is comparatively easy. The simplest way is to make an incision 1 inch long into the suprapatellar pouch on the side nearest to the surgeon, push curved forceps through to the other side, cut down on the points, and with them grasp a medium-sized drainage-tube, which is thus drawn through. Then the same procedure on either side of the ligamentum patellæ. This usually needs to be combined with posterior drainage. The excellent suggestion has been made that a patient should be placed and kept face downwards, with dependent drainage through an anterior wound and tubes, but this is only a temporary expedient.

[1] Makins: Brit. Med. Jour., 1917, i., 799. Barling, Gray, Rankin, Ogilvie, and Max Page: Ibid., 1917, ii., 277, 288. J. Campbell and H. F. Woolfenden: THE LANCET, 1917, ii., 185. T. S. Novis: THE LANCET, 1917, ii., 12. E. Garside Dixon: THE LANCET, 1918, i., 404.

[2] Brit. Med. Jour., 1917, i., 798.

Transverse incision.—To obviate the need for multiple incisions, especially the posterior ones, some surgeons practised long transverse anterior incisions; and Peck further recommended putting up the knee at an acute angle, with the anterior flap everted and the joint widely open. In 1915 I saw some such cases at Brighton, and in 1916 five of the worst cases here were treated by Peck's method. In our experience this is very unsatisfactory. In spite of the widely open joint, treated by continuous or intermittent irrigation, pus tracked behind the joint, the discharges were profuse and dressings very painful. All these cases and those seen at Brighton came to amputation. In two cases the tibia and fibula had become subluxated backwards and upwards. During 1915 I saw some other cases with what might be called *fancy* incisions—such as one 9 inches in length splitting the patella and another with four huge vertical incisions down the front and sides.

Fullerton has advocated early *partial excision with separation of the bones* and free lateral drainage. Our experience of this has not been favourable; one case required amputation, and another died from pulmonary abscess secondary to a bed sore. Theoretically, when carried out in conjunction with the Carrel method it sounds promising.

It should be noted that our cases here present themselves too late for *early* excision, but only in what Sir George Makins calls the *intermediate* period. With regard to this he says:—

> "It can only be undertaken with the definite intention of following it at once by an amputation if the procedure is followed by local extension of infection and signs of systemic absorption. It has, however, proved that excision may be a successful alternative when the severity of the general and local signs seems to indicate amputation as the only resource."

When performed for infective arthritis without extensive bone damage, excision of the limited type advocated by Fullerton may be regarded as a method of insuring thorough drainage, as well as obtaining a clean surface by removal of comminuted bone. In many cases some form of irrigation seems valuable.

In 1915 many of us were using normal saline, or weak iodine, or permanganate solutions. Then came Dakin's hypochlorite. Continuous irrigation certainly saved some limbs, but we could not fail to see that the solutions too often poured along the gutters without flushing the whole road, that they ran out through the tubes, or trickled over the surface without reaching the pockets or all the joint pouches.

That is where Carrel's technique is valuable, instilling the antiseptic into every recess; but Carrel is not himself very optimistic about the method as applied to developed sepsis of the knee. In our hospital it certainly appeared to save three joints. But it should also be noted that the Carrel method is not easily carried out in conjunction with that thorough dependent drainage which is a cardinal principle of knee surgery. Of late flavine irrigations have been similarly used.

Statistics.

During the two years covered by this report, 1916 and 1917:—

1.	Total knee-joint cases treated (not including some in which the joint was secondarily affected)	86
2.	Acute septic arthritis	31
3.	,, ,, ,, with bony injury	15
4.	,, ,, ,, without bony injury	16
5.	,, ,, ,, treated by Peck's method	5
6.	,, ,, ,, amputated after ditto	5
7.	,, ,, ,, treated by free incisions and drainage	26
8.	,, ,, ,, amputated after ,, ,,	10
9.	Total amputations (= 17·3 per cent. of total cases, 48·3 per cent. of septic cases)...	15
10.	Mortality (= 12·9 per cent. of total septic cases)	4
	,, after amputation (= 13·3 per cent. of amputations)	2
	,, without ,, ...	2

Cause of death.—Toxæmia, 1; abscess lung, 1; phthisis, 1; tetanus, 1. Early amputation would probably have saved three of these cases.

The knee-joint figures for 1918 up to September show a great improvement on the above.

Summary.

1. In the earliest stage of infective traumatic arthritis an attempt should be made by tapping and distending the joint with some antiseptic, such as flavine or iodoform emulsion, to abort the sepsis. This is being successfully done in France. Good fixation of the limb is essential.

2. When sepsis is established *thorough* drainage is essential; anterior lateral incisions do not suffice; the Peck method is not successful. Suprapatellar, antero-lateral, and postero-lateral incisions should be used in combination.

3. If there is bone damage excision is desirable in most cases, and the bone surfaces may be kept apart.

4. Carrel's method offers the only effective way of introducing an antiseptic fluid into the recesses of the injured joint.

5. With other methods burrowing of pus very frequently occurs, with abscesses tracking up and down the limb and septic absorption; and amputation is apt to be performed too late, when the vital powers have succumbed to the prolonged strain and sepsis has become generalised with a perhaps fatal result.

My acknowledgments are due to the various surgeons associated with me in this hospital, and to Lieutenant-Colonel R. P. Bond for permission to publish this paper.

THREE PLASTIC FACIAL OPERATIONS.

BY R. LAKE, F.R.C.S. ENG.,
SURGEON, ROYAL EAR HOSPITAL, ETC.

DURING the last decade there have been very numerous improvements in plastic operations for altering the shape of the nose and repairing the unsightly results either of disease or injury, and last year a long paper appeared in THE LANCET by Captain Seccombe Hett[1] depicting and describing the methods that are at present in vogue (many of them new) for repairing the effects of war injuries. I am tempted to report three cases in which I have performed plastic operations, one of them only being the result of injury.

CASE 1.—A young man, brought to me by Dr. Thomas Wingrave, was desirous of having his nose so altered as to render his race less obvious. The method adopted is depicted in Fig. 1, and was commenced by separating the ala nasi on one side from the cheek, the incision going through the fold between the ala nasi and the face. The ala nasi was then retracted and the mucous membrane of the septum divided by a curvilinear incision, with the concavity forwards, commencing close to the nasal bone and ending just at the lower anterior margin of the cartilaginous septum. The muco-perichondrium was reflected in both directions, and a strip of cartilage, semicircular in shape and about 3/16 inch in width and the whole length of the incision, was removed. The anterior portion of the nose was then pushed upwards until the two cut surfaces of the cartilage came in contact; it was rotated on itself in an upward direction until the inferior aspect of the nose was at right angles with the upper lip. The cut surfaces of the mucous membrane were joined with a few catgut sutures and the ala nasi sewn in place, and two thin rubber splints inserted just to hold the nose in position during healing. The result was extremely good and quite satisfied the requirements of the patient.

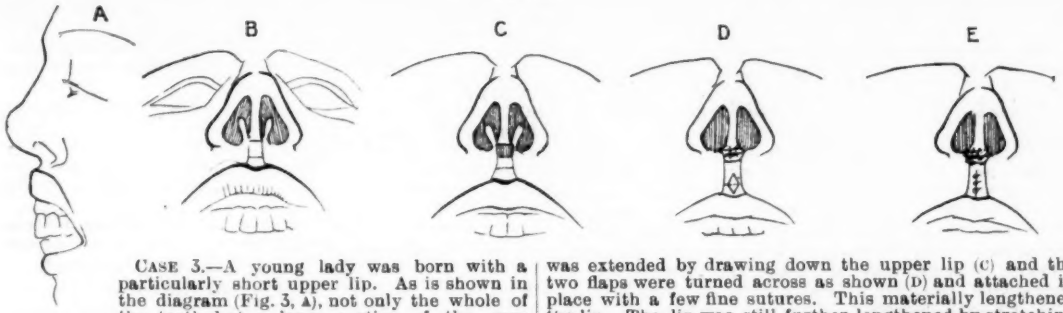
FIG. 1.

FIG. 2.

CASE 2.—An officer in the R.A.F., as the result of an accident, had a large depression in the cartilaginous portion of his nose and a gravely deflected septum. (Fig. 2.) The latter I removed by a submucous resection, taking a strip of the cartilage about 1/16 inch square. By means of a long angular knife a bed was made in the subcutaneous tissues in the depressed part of his nose, and the strip of cartilage was slipped in. As, however, this strip was not quite sufficient a second was inserted at a later date, having been taken from the nose of a brother officer who had an ordinary submucous resection performed. This practically restored the nose to its original shape.

[1] THE LANCET, 1917, ii., 892.

FIG. 3.



CASE 3.—A young lady was born with a particularly short upper lip. As is shown in the diagram (Fig. 3, A), not only the whole of the teeth but a large portion of the gum were visible. The various stages of the operation are shown in the figures. The first stage was to make two transverse incisions across the centre of the upper lip, one just at the base of the nose and the other about midway between the lip and base of the nose. Next, two skin flaps were dissected out on either side from the surface of the septum, just within the vestibules of the nose. These are shown dissected out (B). The upper incision was extended by drawing down the upper lip (C) and the two flaps were turned across as shown (D) and attached in place with a few fine sutures. This materially lengthened the lip. The lip was still further lengthened by stretching the lower incision (D) and turning it from being a transverse into a vertical one, and sewing the edges together with a few fine sutures (E). The eventual result was extremely good, the whole of the gum and nearly the whole of the teeth being covered by the upper lip. No scar was visible at all, and the appearance was materially improved.

Cavendish-place, W.

A NOTE ON

THE TREATMENT OF MALARIA BY DISODO-LUARGOL.

BY W. A. MURRAY, M.B., C.M., D.T.M. & H.,
CAPTAIN, ROYAL ARMY MEDICAL CORPS;
AND
R. W. HAROLD ROW, B.Sc., F.L.S.,
PROTOZOOLOGIST TO THE MALARIA DEPARTMENT, 4TH LONDON GENERAL HOSPITAL.

A PAPER on the successful treatment of two cases of malaria by disodo-luargol, by Dr. Louisa Hamilton and Dr. Morna Rawlins, having appeared in THE LANCET of April 6th, 1918, we thought it our duty to try the same treatment on a series of cases in this department, with the results given below.

Altogether six cases have been selected for this investigation, each of which was positive on admission to the hospital—i.e., had asexual parasites in the peripheral blood. The treatment in all cases precisely followed the method described in the above-mentioned paper, save that in two cases it was not possible to carry it through to the end. Blood examinations were made daily in all cases.

Notes of Cases.

CASE 1.—Contracted malaria in G.E.A. in October, 1916; had many relapses from time to time, but was not in hospital. Admitted here 24/7/18 with a temperature of 104° F. and *P. vivax* present in large numbers. The first two doses of disodo-luargol had no effect on either the temperature or the parasites. Unfortunately, after ten days' treatment the patient developed measles, the disodo-luargol course was abandoned, quinine given, and the case was transferred to the M.A.B. hospital at Tooting.

CASE 2.—Contracted malaria in Salonika in September, 1916, had many relapses, and was invalided home. Admitted to this hospital 22/5/18, with temperature 101°, enlarged spleen, and *P. vivax* in fair numbers in the blood. After the first injection the temperature dropped to normal and the asexual parasites disappeared from the peripheral blood. This continued until the seventeenth day, when he had had four injections (the last on the twelfth day), and then the temperature shot up to 105°, though no asexual parasites were found in the blood. An attack of pneumonia followed, and the last three injections of disodo-luargol were not given. He recovered normally, and no further attacks of malaria have as yet occurred. It should be noted, however, that after recovery from pneumonia he was given quinine hydrochloride gr. x daily.

CASE 3.—Contracted malaria in Salonika in August, 1916, and invalided home after many relapses at the beginning of 1918. Admitted here 8/5/18 with a temperature of 104°, a much enlarged spleen, and *P. vivax* present in the peripheral blood. The temperature continued to show a regular, though slight, tertian rise until three days after the third injection, after which it remained normal or subnormal for a week, and did not rise above 99° during the rest of the course. Asexual forms of *P. vivax* remained in the blood until the day after the fourth injection, while three days later *P. falciparum*, both "rings" and "crescents," appeared, though unaccompanied by a rise of temperature, and the crescents remained until some time after the end of the treatment. Eleven days after the completion of the disodo-luargol course *P. vivax* reappeared, and two days later there occurred a frank relapse with a temperature of 104·2°. He was then put on to full doses of quinine and quickly recovered, but was invalided out of the Service for other reasons.

CASE 4.—Contracted malaria in G.E.A. in March, 1917, had several relapses, and returned to England in March, 1918. Admitted here 17/6/18 with temperature 99·8°, anæmia, and enlarged spleen. *P. vivax* present in large numbers. The temperature became normal two days after the first injection, but asexual parasites remained until the second day after the third injection (i.e., for ten days after the commencement of treatment). Asexual parasites reappeared the day after the last injection; the patient's general condition, however, was much improved, and there has been no clinical relapse to date.

CASE 5.—Contracted malaria in Salonika in April, 1917, had many relapses, and was invalided home in May, 1918. He was admitted here 25/6/18 with normal temperature, much enlarged spleen, and enlarged liver. *P. vivax* was present in the blood. One day after the second injection of disodo-luargol his temperature went up to 101° and the asexual parasites, which had never disappeared, showed a distinct increase in numbers. The temperature became normal two days after the third injection, but the parasites have persisted throughout the course, and since.

CASE 6.—Contracted malaria in Salonika, in September, 1916, and was invalided home after many relapses on 24/5/18. He was admitted to this hospital 24/6/18 with a temperature of 100°, spleen much enlarged, and *P. vivax* present in the blood. His temperature has not risen above 99° since the first injection of disodo-luargol, but the asexual parasites remained until four days after the third injection, and reappeared four days after the termination of the course.

Results.

Of the above six cases we have thus been able to carry out the complete treatment in four, with the following results. In one case a clinical and parasitic relapse occurred 11 days after the end of the treatment; in one case the asexual parasites have never disappeared; in the other two cases, although the parasites disappeared, in each case they have reappeared—in one immediately, in one four days after the last injection. Consequently, there is no case in the four in which the disodo-luargol can be considered to have been even temporarily successful, for the presence of asexual parasites in the blood means that a clinical relapse must be regarded as only a question of time. Further, the comparatively long time taken for the asexual parasites to disappear from the blood (16, 10, and 12 days, respectively, in Cases 3, 4, and 6, and not at all in Case 5) does not lead one to anticipate that disodo-luargol is likely to be so effective in the treatment of malaria as quinine, which normally achieves this same result in four days.

There is also a technical point to be mentioned in connexion with the use of this drug. The solution being almost black, it is difficult to be certain that the needle is in the vein, as the back flow of blood cannot be seen, and if the fluid be injected into the surrounding tissues, as happened to us on one occasion, considerable irritation is caused.

In addition to the six cases described above, we have had under observation in this hospital five patients who had partial courses of disodo-luargol at another hospital, and four of these cases have had relapses, both clinical and parasitic, while here.

To summarise our results, we think we have shown that disodo-luargol is no specific for malaria, and in our opinion there are several reasons, both clinical and technical, to render it far less suitable for use than quinine.

In conclusion, we wish to express our thanks to Colonel Sir Ronald Ross, consultant in malaria, and to Lieutenant-Colonel Sir Nestor Tirard, O.C. 4th London General Hospital, for permission to publish these notes.

BREAST-FEEDING: FARADISATION OF THE MAMMARY GLANDS.

BY ELIZABETH SLOAN CHESSER, M.B. GLASG.,

MEDICAL OFFICER, LEYTON AND LEYTONSTONE ANTE-NATAL AND INFANT WELFARE CENTRES; M.O., CARSHALTON ANTE-NATAL AND INFANT WELFARE CENTRES AND CARSHALTON CRECHE; ASSISTANT PHYSICIAN, QUEEN'S HOSPITAL FOR CHILDREN.

THE importance of breast-feeding in reducing the infant mortality rate is generally recognised. Every physician associated with ante-natal and infant welfare work realises that our best hope of saving infant lives is to encourage natural feeding by every possible means. The general hygienic care of the mother, sufficient and suitable food, regulation of work, rest and sleep, the judicious use of galactogogues, attention to dental caries or other forms of sepsis, are each important. The baby's habits also affect the supply of milk. If the infant is allowed to take the breast night and day at irregular intervals the supply of milk is at once jeopardised. There are women, of course, of the perfect nursing type, whose milk seems unaffected by insufficient diet, hard work, even excess of alcohol. The average woman, however, is very largely influenced by physical and psychical causes, and many hundreds of women complain that the "milk goes" in spite of faithfully carrying out the doctor's orders. These are the cases which call for some special treatment, and it was in considering the "failures" amongst my nursing mothers that I conceived the idea of trying electrical stimulation of the mammary glands.

Description of Method.

As a general routine, every nursing mother at my infant centres is advised with regard to diet, her teeth are attended to, and she is recommended to lie down for 1½–2 hours every afternoon when the baby is asleep. This, of course, cannot be managed in all homes, but by insisting on its importance and by advising the mother as to the regulation of her duties, &c., it can be carried out in the majority of cases. The baby is put to the breast every three hours for the first three months of life—viz., at 6 A.M., 9, 12, 3 P.M., 6, and 10, and every four hours from four months old. No night feed is permitted unless in special circumstances. If the baby's gain is not satisfactory a test meal is given according to the usual practice.

Immediately before a feed is due the baby is weighed naked, except for a napkin in case of bladder or bowels acting during the test. He is then given one breast for 12 minutes and weighed again; put to the second breast for

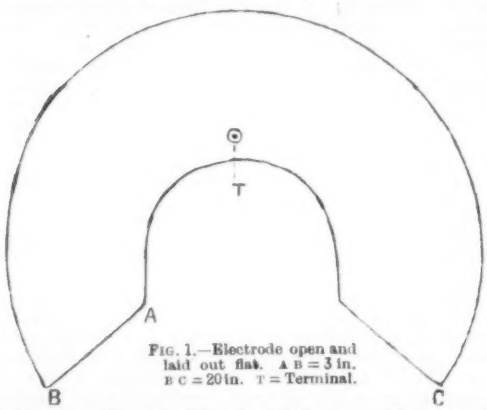


FIG. 1.—Electrode open and laid out flat. A B = 3 in. B C = 20 in. T = Terminal.

12 minutes and weighed for the third time. The amount of milk taken from both breasts is easily estimated. If the milk is insufficient, such a galactagogue as lactagol is ordered, and the mother may be advised to take extra proteid or fat, or both.

If after two or three weeks the infant's gain in weight is still unsatisfactory, my practice now is to stop galactagogues and apply faradisation. This is undertaken at Leyton Town Hall, where our average weekly attendance of mothers is 40–50, and I also send suitable cases from Leytonstone to the Town Hall for treatment.

I use two hollow cone-shaped flexible zinc electrodes. The circular bases fit round the breasts, and they can be adapted evenly to the surface of the glands. This form of electrode was suggested to me by my father, Dr. Samuel Sloan. The electrodes are fixed in place with an elastic bandage. An ordinary faradic coil is used, and the connecting cables are attached from the secondary terminals to soldered terminals on the electrodes, which may be used bare or underlaid with several layers of moist lint. The current is passed through the two breasts for 20 minutes twice a week. I prefer to apply the treatment three times a week if it can be arranged.

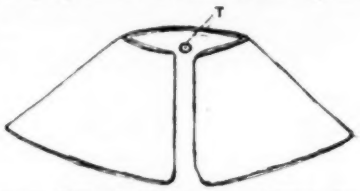


FIG. 2.—Electrode folded to fit round breast. The edges are shown nearly to meet, and they can overlap if required.

The patient feels a gentle tingling, there is no discomfort or pain, and the only inconvenience consists in having to strip to the waist so that the electrodes may be properly applied.

Results.

The results of the treatment have surpassed my expectations. I give below a few typical cases taken from the first series of 12 cases which have had faradic treatment:—

CASE 1.—A poorly nourished infant of 5 weeks suffering from constipation and vomiting after meals; weight 8 lb. ½ oz. Breast-fed every 2½ hours. Breasts well developed; right nipple very small (a nipple shield was ordered). Physical examination negative. Instructions were given with regard to suckling, and the mother was cautioned against allowing the baby to have the milk too fast. The child was to be fed every three hours and no night feed allowed. Test feed; 2½ oz. was the total obtained from both breasts. In four weeks the child had gained an average of only 1 oz. per week. Electric treatment twice a week was then ordered and this was continued for five weeks. The average weekly gain became 4 oz. per week, and the two weeks following the cessation of electric treatment the gain was 5 oz. per week. The mother declared that after two or three treatments she felt stronger, "the milk flowed into the breasts and poured away." The baby became contented, the vomiting ceased, and constipation diminished.

CASE 2.—Child of 4½ months; weight 12 lb. 7 oz.; had not been thriving. At the second attendance the following week, the child weighed 12 lbs. 4½ oz.—a loss of 2½ oz in spite of the usual instructions. Test feed demonstrated that the child was having only 2 oz. of milk from the mother. Breasts flabby, no sensation of fullness at feeding time. Electric treatment was therefore ordered twice weekly. In two months the child gained an average of 4 oz. per week. Baby contented and thriving, formerly cried continually. After two treatments the mother said she felt the breasts fuller, and this improvement continued and was maintained after cessation of treatment.

CASE 3.—Child of 5 months; 12 lb. 3 oz. Before electric treatment was started it was only possible to draw off a tablespoonful of milk at feeding time. Baby was having two bottles of 6 oz. daily to supplement breast-feeding. After four weeks of electrical treatment baby required only 3 oz. of humanised milk once daily in addition to breast. Average gain 4½ oz. per week.

CASE 4.—Child of 3 months; 9 lb. 13½ oz.; poorly nourished, not gaining. After two electric treatments the mother said: "The milk now runs in when I nurse baby, and did not do so before." After nine electric treatments: "Baby quite satisfied, ample milk." Average gain 3½ oz. weekly, in spite of the fact that the child had an attack of bronchitis during treatment.

Of a first series of 12 consecutive cases, 2 must be eliminated, as they were only able to attend for electric treatment twice. Of the remainder, 5 had from 8–10 treatments, 5 were sufficiently improved in from four to seven treatments. In every case the child improved in health and an average gain in weight of 3½ to 5 oz. a week was maintained. In 6 cases the average gain in weight prior to beginning electric treatment was 1½ to 2 oz. a week; in 4 cases the treatment was started at the first or second attendance of the child at the clinic, as the test meal showed that the infant was having less than half the required amount of milk from the breasts and the case seemed urgent.

I had intended to send a specimen of mother's milk in every case to a laboratory for analysis before and after treatment, but in most cases only a teaspoonful to a tablespoonful of milk could be extracted from the breasts which, when sent to the laboratory, was found to be useless for any complete examination. In giving faradic treatment it may be necessary for a couple of weeks to supplement the mother's milk by cow's milk or artificial food. This interferes with the experimental part of the work, but it is interesting to find that with several treatments the milk is so improved in quantity and quality that extra feeding can gradually be reduced and given up entirely.

I have to thank Major J. F. Taylor, medical officer of health of Leyton, for allowing one of his health visitors, Nurse Dodds, to carry out the bi-weekly treatments under my directions.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

RECOVERY AFTER COMPOUND FRACTURE OF SKULL WITH EXTRAVASATION OF BRAIN.

BY T. E. COULSON, M.D., F.R.C.S.EDIN.,
TEMP. LIEUTENANT, R.A.M.C.; SURGEON TO THE MERTHYR GUEST HOSPITAL, TEMPLECOMBE.

THE following case of compound fracture of the skull with extravasation of brain matter, in which immediate operation resulted in complete recovery, may be of some interest:—

On June 13th, 1918, a boy, aged 9, was riding in a wagon in a hayfield with two girls, when the horse "bolted." One of the girls jumped out over the side of the wagon, the wheel went over her leg, and she sustained a compound fracture-dislocation of the ankle-joint. The other girl became frightened, seized the child and threw him out of the wagon over the side, both wheels going over his head. She herself then climbed out over the back and escaped unhurt.

Photograph of patient on June 26th, 13 days after operation.

This happened at about 4 P.M., and the boy was admitted to the Merthyr Guest Hospital at 4.30. When I saw him at 4.45 he was semi-conscious, vomiting almost continuously, blood and cerebro-spinal fluid coming freely from both ears. There were two wounds, each about the size of a threepenny-piece, on right side of head, one about 2 inches above right ear and the other about halfway between right ear and right eye; from the former of these brain matter was oozing in considerable quantity. There was a linear depressed fracture on both sides of head running from before backwards. Temperature subnormal; pulse 90 per min.; pupils dilated and equal; no paralysis of face or limbs.

I operated at 5 P.M. After shaving the head and painting it with chloroformum iodi an incision was made from a point 1½ in. behind right ear vertically upwards for 3 in., then directly forwards for 5½ in. to a point 1½ in. above centre of right eyebrow. This curved incision ran ½ in. above line of depressed fracture on this side. At posterior end this fracture was star-shaped, one "limb" of star pointing downwards in front of right ear (from this brain matter was oozing), one pointing behind right ear, one upwards and backwards, and the main fracture forwards to the point 1½ in. above centre of right eyebrow. The centre or "body" of the star was missing altogether, but was eventually found beneath the parietal bone, between it and the dura. It was withdrawn and discarded.

Attention was now turned to the main depressed fracture on this side. The lower fragment was depressed beneath the upper, so that the latter overhung the former by about ⅛ inch. I therefore cut away with bone forceps a wedge-shaped piece of upper fragment about its centre and, introducing an elevator, lifted up lower fragment on a level with upper. There followed a good deal of hæmorrhage, which, however, ceased in a short time. The fracture on left side extended from the point 1½ in. above centre of right eyebrow, where fracture on right side ended, backwards to the left to a point 3½ in. above left ear, and then directly backwards for 1½ in. I made an incision about ½ in. below line of this fracture. The illustration shows line of incision on this side.

On the left side upper fragment was depressed beneath lower fragment to extent of about ⅛ in. I applied a ¾ in. trephine to edge of lower fragment at angle above left ear, and introducing an elevator levered upper fragment into position level with lower fragment. This fracture ended posteriorly in a star-shaped manner, but the "star" was not so marked as on right side, and no brain matter was being extravasated on this side.

The various manipulations described had by now taken some time, and the boy having lost a good deal of blood he began to show signs of shock. The pulse became very weak and fast; it had risen to 130 per minute. Respirations became "catchy," and would occasionally cease for a considerable time. I had intended to investigate fracture running in front of right ear from which brain matter was coming away, but it became evident that the boy would not stand any further procedure, so I contented myself with swabbing the brain matter away with an antiseptic and stitching up the whole wound with interrupted fishing-gut sutures, without drainage.

For the first day or two patient was in an extremely critical condition, semiconscious, very violent and irritable when roused; pulse 120; temp. subnormal. Calomel gr. iii. was given on the evening after the operation and after this had acted on the following evening he became much quieter and more rational. On June 16th he was able to answer questions rationally, took his food well, and began to have control over bladder and rectum. The stitches were removed on June 22nd and all bandages taken off on the 26th. On June 23rd, 24th and 25th there was very slight watery blood-stained discharge from both ears and a very slight amount of epistaxis on June 25th.

The boy is now up and about and appears perfectly normal in all respects with the exception of slight deafness in left ear.

RADICAL CURE OF A VERY LARGE INGUINAL HERNIA.

BY C. P. G. WAKELEY, M.R.C.S. ENG., L.R.C.P. LOND.,
TEMPORARY SURGEON, R.N., H.M. HOSPITAL SHIP "GARTH CASTLE."

Dr. J. A. Browne's case of large inguinal hernia,[1] which was reported in a recent number of THE LANCET, aroused my interest because I had a very similar case under my care several years ago, when I was house surgeon to Mr. Albert Carless at King's College Hospital. The enormous size of the hernia can be seen from the photograph; it was a left oblique inguinal hernia and descended to the patient's knees, causing great inconvenience in walking. The patient, aged 50, was a very tall man. He stated that he had noticed the rupture for over 10 years. The hernia could be reduced with difficulty, but could not possibly be controlled by any form of truss or bandage. The penis was completely hidden,

and could only be located at the bottom of a small depression at the upper part of the swelling. Micturition was difficult at times. The opening of the canal admitted four fingers easily. The patient was kept on his back with the foot of the bed raised for two weeks previous to the operation. A radical cure was performed; the left testicle, which

[1] THE LANCET, 1918, ii., p. 106.

had atrophied considerably, was excised and the inguinal canal completely closed. A large portion of the skin of the scrotum was removed. Quite 12 feet of small intestine were found in the hernial sac, together with most of the pelvic colon. The hernial sac was completely excised and the wound healed by first intention. I saw this man a year after the operation, and he stated that the result was excellent and that he had experienced no trouble at all. It seems to me that with a hernia of such a size and duration the best form of treatment is to excise the testicle, which is often functionless, and completely to close the inguinal canal.

A CASE OF

STRANGULATED INGUINAL HERNIA WITH EXTERNAL RUPTURE OF THE SAC.

BY HAROLD F. RENTON, M.D., B.S.LOND., M.R.C.S., L.R.C.P.

ALTHOUGH it is usually taught that a hernia of the bowel presenting through one of the common abdominal orifices and in a strangulated condition may rupture and discharge its contents externally, yet no such condition had come before my notice until I was called upon to treat the following case.

On July 19th, 1917, I was asked to see a lady in the country with a severe attack of vomiting which nothing relieved. On entering the room I smelt a strong fæculent odour. The patient, aged 50, was in bed propped up with pillows; breathing short and painful. The face was drawn and anxious, pupils dilated, tongue dry and coated with brown fur. At intervals she was seized with a violent attack of vomiting; vomited matter brownish fluid and typically fæcal. Pulse rapid and almost impalpable; temperature subnormal. The abdomen was very distended and tympanitic; marked peristalsis, localised to umbilical area and typically "ladder" in character, indicating the obstruction was involving small intestine. In right inguinal region was a large swelling, black in colour, from which came the powerful fæculent odour. The swelling, surrounded by an area of inflammation, was tympanitic to light percussion.

A diagnosis of strangulated inguinal hernia was made, and it was clear that the hernial contents were gangrenous. It was elicited that the rupture had been present four years; it had not given rise to any pain or discomfort until onset of present acute attack some four weeks previous to my visit, when she was seized with acute pain in the swelling. Absolute constipation followed, as well as persistent vomiting, which had existed during the whole of the four weeks.

It was obvious that patient was too ill to undergo any operation at that moment, and that the best to be hoped for was that the hernial sac should burst externally and relieve the urgent symptoms. I ordered hot fomentations to be applied to the tumour, and a limited fluid diet to be administered.

The condition remained unchanged until the morning of July 23rd, when the tumour burst, discharging an enormous quantity of semi-fluid fæces, bright yellow in colour and strongly alkaline. Thus the original observation that the obstruction had involved the small intestine was supported.

The prompt amelioration was remarkable. With cessation of vomiting the pulse and temperature approached the normal and the tongue became clean. The anxious expression went; abdominal distension disappeared. The patient reported that she felt well and was quite free from pain. A liberal fluid dietary was commenced, and on the third day after rupture of hernial sac the woman was taking ordinary food together with a generous supply of stimulant without any return of sickness.

Despite this, however, and every care and attention, her condition slowly became worse, and she died on the morning of August 1st, one week after the formation of the fæcal fistula, with all the signs of collapse. Her appetite remained good and her spirits bright up to the end.

This case would seem to be of interest for the following reasons;—

1. *Its rarity.*—From personal observation, and after discussion with medical friends, none of whom had seen a case, I conclude that such a termination to a strangulated hernia is very rare. Probably the cases are generally handed over to the surgeon before rupture is allowed to take place.

2. *Duration of strangulation.*—According to the patient, she had been suffering from vomiting and absolute constipation for some four weeks. It is not always wise to rely too much upon a patient's information, yet from the appearance of the hernia, the gangrenous condition of its contents, and the inflammation of the surrounding tissues the bowels must have been in a state of strangulation for a very considerable period. Remembering how rapidly collapse and death supervene in a case of unrelieved intestinal obstruction, the long duration of the woman's suffering becomes all the more remarkable.

3. *Cause of death.*—It had been hoped that after rupture of the hernial sac, and with relief of the acute symptoms, the woman's condition might have improved sufficiently to enable her to undergo an operation for closure of the fæcal fistula, but despite a generous dietary and free stimulation she steadily lost ground. The colour of the fæces and their strongly alkaline character showed that the portion of small bowel involved in the hernia was at a very high level. It seems clear that death was due to the cutting off of an enormous portion of the absorptive area of the intestinal tract. But for this fact no doubt is entertained that the woman's life could have been saved.

It will naturally be asked why I did not at once open the hernial sac, and some doubt may be expressed as to the possibility of any patient living so long with obstruction at such a high level in the bowel. As a result of my first examination I came to the conclusion that the woman would only last a few hours and that no treatment could postpone the end. The local treatment was employed with the sole intention of doing something to relieve her suffering. Two methods of procedure offered themselves had I decided to operate. First, by general anæsthesia, which would certainly have hastened the end; and, second, by plunging a knife boldly into the sac. As it had not been determined what was the cause of the obstruction, and as this might possibly have been due to the sudden entry into the sac of some new and healthy organ, a haphazard incision might have resulted in injury of a grave nature, to an otherwise healthy organ, and the last state of the patient have been, if possible, worse than the first.

It is certainly more difficult to give a satisfactory answer to the second question. Unfortunately, I have not ready access to the literature on the matter, although it must be admitted that the general teaching is that the higher the level in the bowel at which lies the point of strangulation, so much the more severe is the shock, and rapid the end.

My deductions as to the possible position were based upon clinical observation before rupture of the sac—namely, the site and character of the peristalsis, and later, upon the fluid, yellow nature, and strongly alkaline reaction of the discharges when rupture had taken place. In any case, it would be interesting to hear expert opinion on this point.

Doncaster.

New Inventions.

A NEW RUBBER MASK SPECIALLY DESIGNED FOR GENERAL ANÆSTHESIA WITH ETHYL-CHLORIDE AMPOULES.

AN ingenious apparatus for general anæsthesia with exact dosage of ethyl-chloride as gauged for each particular case has been brought to my notice. It is so constructed that the whole of the ethyl-chloride contained in each graded glass ampoule is administered gradually, fully, and without loss. The whole apparatus consists of one piece of rubber; it is therefore pliable, easily carried, convenient to handle, and thoroughly sterilisable. The interior of the mask communicates through a short wide-bore tube by a T-joint with another tube running at right angles. One limb of the T receives the ampoule, the other limb is closed at the end, and is armed in the centre of its blind end with a pin projecting into the centre of the lumen. This limb receives the umbilicated end of the glass ampoule of ethyl-chloride. When the ampoule is pressed home the pin first impinges on and then perforates the umbilicated end, and the ethyl-chloride vapour streams out along the short wide tube on to a gauze pad suitably placed and held in position by a rubber band. The vapour diffuses throughout this pad, from which it is breathed by the patient. This pad is easily removed after each case and replaced by a fresh one. The rubber band keeps it lightly but firmly in position. There is no waste of ethyl-chloride and the dosage is exact. If one ampoule proves insufficient, it can, when exhausted, be quickly supplemented by another full ampoule of any desired capacity, the change requiring a minimum of time or trouble. If before introduction the glass ampoule is slightly moistened, no difficulty will be experienced in pushing it smoothly into the tube to the full extent required to cause the pin to puncture it at the desired moment. I have tried this mask on myself and find that it fits quite comfortably.

The makers are the Anglo-French Drug Company, Ltd., Holborn, London.

F. C. BARLOW, L.R.C.P. & S. Edin., L.F.P.S. Glasg.
Camberwell, S.E.

Reviews and Notices of Books.

War Wounds of the Lung: Notes on their Surgical Treatment at the Front. By PIERRE DUVAL. Authorised English translation. Bristol: John Wright and Sons, Ltd. 1918. Pp. 100. Price 8*s.* 6*d.*

WE have already noticed (THE LANCET, Sept. 8th, 1917, p. 393) Dr. Pierre Duval's admirable monograph, "Les Plaies de Guerre du Poumon," and commend it again to our readers in its English guise. A new chapter added to the translation brings the author's experience up to January of the present year, and concludes with a sentence epitomising his whole teaching: "Lung wounds are analogous in every respect to any other battle wound, and must be treated according to the same general principles."

The translation emanates from the 36th Casualty Clearing Station, B.E.F., which has been in close association with the Auto-Chir. No. 21, Armée Française, of which Duval is médecin-chef, and the dedication gives occasion for an expression of that mutual esteem and admiration which is making the Anglo-French entente a real and permanent thing. Both text and illustrations are well done and the external trappings of the book very pleasing.

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1. *The Treatment of War Wounds.* By W. W. KEEN, M.D., LL.D., Emeritus Professor of Surgery, Jefferson Medical College, Philadelphia. Second edition. London and Philadelphia: W. B. Saunders Company. 1918. Pp. 276. Price 8*s.* 6*d.*
2. *American Addresses.* By Sir BERKELEY MOYNIHAN, M.S. Lond., F.R.C.S. Eng. London and Philadelphia: W. B. Saunders Company. 1917. Pp. 143. Price 7*s.* 6*d.*

TWO attractive little books published in the United States of America will help to bring recent remarkable developments in war surgery before the medical world of the great republic of the West.

1. Dr. Keen has enlarged his bird's-eye view of English and French surgical practice on the Flanders front. He has collected his material from many sources, and the volume will be read with interest as the considered judgment of a veteran surgeon, whose detachment allows him to see relative values in a mass of new and absorbing work. The short bibliographies attached to some of the chapters may give a useful hint for the war surgeon's library.

2. Sir Berkeley Moynihan has collected in one volume the addresses on gunshot wounds and injuries delivered last autumn in Chicago and other American cities, giving his own conclusions on the treatment of the many new phases of surgical diseases for the benefit of his American colleagues. We commented at the time of their delivery on these crisp and enlightening summaries, and commend them in their present form to the reader's notice.

La Suspension dans le Traitement des Fractures: Appareils Anglo-Américains. By P. DESFOSSES and CHARLES-ROBERT. Preface by M. PIERRE DUVAL. Paris: Masson et Cie. 1918. Pp. 172. Price 4 frs. 40.

THIS latest fascicle of the Collection Horizon is an admirable example of the war manual at its best. M. Desfosses is surgeon to the *Hôpital britannique* in Paris, and M. Robert is a pupil of Major Sinclair who has applied the latter's methods in the famous Auto-Chir. 21 to which M. Duval is attached. The manual starts with a description of the suspensions known by the names of Blake, Sinclair, and "Balkan," going on to their detailed application to fractures of the extremities. Each stage in the application is abundantly illustrated. M. Duval in his preface frankly acknowledges his preference for the Thomas splint, but many other ingenious forms appear in the text. The little book is a safe technical guide to the successful treatment of gunshot fractures of the limbs.

An Index of Prognosis and End-Results of Treatment. By Various Writers. Edited by A. RENDLE SHORT, M.D. Lond., F.R.C.S. Eng. Second edition. Bristol: John Wright and Sons, Ltd. 1918. Pp. 770. Price 30*s.*

WE are glad to see a second edition of this useful work of reference, to which fresh material has been added in view of recent experience on tetanus, gas gangrene, septic peritonitis, and gunshot wounds. The account of tropical diseases has been rewritten by Sir Leonard Rogers. We miss any allusion to the now very important disease, trench fever, but the editor disarms criticism in regard to possible omissions by pleading that he and many of the contributors are serving overseas, and the same war conditions which are vastly extending our knowledge of certain groups of diseases are making it exceedingly difficult to ascertain the "end-results" which are the subject of this book. The appearance of a new edition as soon as possible after conclusion of the war will be very welcome. The publishers' share in the book is all that could be desired.

An Introduction to the Physiology and Psychology of Sex. By S. HERBERT, M.D. London: A. and C. Black, Ltd. 1917. Pp. 136. Price 3*s.* 6*d.*

THE author has already expounded with some success the first principles of heredity and of evolution to a lay audience, and at the desire of the Feminist Club of Manchester has now endeavoured to do the same in a field where many others have failed before him. In this he has been largely successful. The elementary facts of the biology and physiology of sex are rendered in the "simple yet scientific manner," which the author has set before himself. In sex psychology "facts" are less easy to define, and some of the simple assertions made will require modifying in the light of present-day experience. It is, we believe, misleading to state boldly, "To man love is an episode; to woman it is her whole life"—and the statement is not altogether in harmony with the forecast, in the concluding pages, of a new sexual order with which we are in general agreement.

The Practical Medicine Series. Vol. I., General Medicine. Edited by F. BILLINGS, M.S., M.D., assisted by B. O. RAULSTON, A.B., M.D. Series 1918. Chicago: The Year Book Publishers. 1918. Pp. 621. Price $2.25.

THIS is the first volume of a series of eight, to be issued at about monthly intervals, covering the entire field of medicine and surgery, and primarily intended to keep the general practitioner in touch with the newest developments of his science and art. The medical literature of America, England, France, and Switzerland is abstracted for this purpose, and as far as work on this side is concerned, abstracted with care and discretion. We can therefore recommend the series to any who are prepared to face a yearly reading of some 5000 pages in order to keep abreast with current medical thought.

Nutrition and Clinical Dietetics. By HERBERT S. CARTER, M.A., M.D.; PAUL E. HOWE, M.A., Ph.D.; and HOWARD H. MASON, A.B., M.D. Philadelphia and New York: Lea and Febiger. Pp. 646.

THE authors of this ambitious book, who are all members of Columbia University, New York, start from the assumption that dietetics must be deduced in part from an accurate knowledge of the chemistry of foods and of nutrition, but in greater degree from the results of actual clinical experience. Their qualifications render this combined method possible within the covers of a single book inasmuch as the first-named author is an associate in clinical medicine, the second an assistant professor of biological chemistry, and the third an instructor in diseases of children. And the result is a book which will be of real value to the clinician at a time when nutritional problems have largely to be solved on the basis of what is possible rather than what is theoretically advisable. The book is divided into four parts, the first dealing generally with foods and normal nutrition, in which the subject of energy requirement is fully treated; the second takes the various foods seriatim and discusses their particular values and deficiencies; the third is a short part devoted to feeding in infancy and childhood; and the fourth part goes into the dietaries of various diseases and the special régimes proposed for them. An appendix contains tables of food values arranged in a variety of useful ways. The authors, although basing their conclusions largely on their personal experience, are careful also to include due notice of the work of others—e.g., Bardswell's and Chapman's diets in tuberculosis, Joslin's useful résumé of Allen's starvation treatment for diabetes. Their remarks on metabolic problems are always interesting and often stimulating, as in the sections on the causes of

obesity, the food adapted to brain workers, and the appropriate diet for athletes. In the latter connexion they note how easy it is to acquire the habit of large eating and of continuing it after the necessity for it is past, as in the case of "farmers'" indigestion, which they suggest is due to persistence in a large dietary during off seasons, when little muscular effort is demanded. All through the book the influence of new thought on old problems is clearly discernible. The work cannot fail to be a useful vade mecum to the modern practitioner.

"One Thing I Know, or the Power of the Unseen." By E. M. S. London: John M. Watkins. 1918. Pp. 146. Price 3*s.* 6*d.*

IT would not be difficult to ridicule E. M. S.'s autobiographical account of her illness and recovery through the devoted treatment of an unseen spirit whom she calls "Dr. Beale," and yet its evident sincerity wins respect. We are told that E. M. S. had been bedridden for 15 years, and for the past six years had been unable to sit up in bed for more than two minutes without knocking herself up for six or nine months. Exertion such as this made her utterly exhausted, and her pulse rose to 140. She sometimes required food 30 times in the 24 hours, and so on. She had consulted over a dozen medical men, had taken tonics, sedatives, glandular extracts, had Nauheim and Kneipp cures, massage, rest cures, hypnotism—all to no purpose. The "earthly" medical man, whose report is given, states that there was no indication of insanity or hysteria, but, as we read the case, the disorder was clearly functional.

The story as told is no uncommon one in practice. The gravity of the matter lies in the fact that legitimate medicine failed, whilst recovery followed under the influence of several women with so-called psychic powers. Such cases are worth careful scientific study. It is surely a reproach to medicine when patients such as these remain ill for long periods of time and recover by means such as are here described.

Dr. Beale, we are told, died many years ago, and after a deep sleep devoted himself to work on earth, using the body of a Miss Rose and other persons possessing "psychic" qualities. Dr. Beale also had a kind of home in the unseen world where he treated recently arrived spirits who were in trouble. His treatment was interrupted by his being suddenly called to higher spheres for a course of instruction. Fortunately, he left a useful locum-tenent, "Dr. Prentice." We are also told how the possessing spirit is apt sometimes to forget the body of the instrument and "the doctor has been known to ask if his trousers were muddy or his tie straight, and has really been annoyed to find upon looking down that he had on petticoats and a lace collar"!

The fact remains that the patient recovered, and the important question is how it came about. We find two methods of treatment which are novel. By means of magnetic massage Dr. Beale (i.e., Miss Rose) drew out of the body "bad stuff" and threw it away, as it were, from the tips of his fingers. When he was called away during her convalescence he left behind a "psychic battery," upon which, however, she drew so extravagantly that she nearly had a relapse. The remainder of the treatment appeared to consist of massage and exercises continued for months, then gradually she was taught to use her leg muscles and at last to walk. Within two years she was well. There are many other remarkable things in the book, which is vividly written and profoundly interesting, as showing what the "will-to-believe" can do when uncontrolled by experience or the critical faculty.

The Internal Secretions: their Physiology and Application to Pathology. By E. GLEY, M.D., Professor of Physiology in the College of France. Translated and edited by MAURICE FISHBERG, M.D., Clinical Professor of Medicine at New York University. London: William Heinemann (Medical Books), Ltd. 1918. Pp. 241. Price 10*s.*

AT a time when the paramount importance of the endocrine glands, both in normal and abnormal states of the body, is beginning to be realised, while the actual practice of organotherapy remains largely empirical, the appearance in English form of Professor Gley's scientific and critical study is cordially to be greeted. Gley can be trusted to state with equal precision both what we know and what we do not know, and Dr. Fishberg has almost confined himself to rendering the original in fluent English. The chapter on the normal reciprocal relations between thyroid, pancreas, and adrenals is one of the most interesting. References are given throughout the book which render further study easily possible.

Studies from the Rockefeller Institute for Medical Research. Reprints. Vol. XXVII. New York: The Rockefeller Institute. 1917. Pp. 559.

THE titles of this most recent volume of reprints show the prevalent direction of pathological and bacteriological research. Papers by H. Noguchi and others on the staining reactions of various spirochætes are followed by a series of articles on poliomyelitis under the names of S. Flexner and his pupils. Clinical studies are included on the toxæmias of pregnancy, and on metabolism in lymphatic leukæmia. An ingenious mathematical study from Hospital No. 21, at Compiègne, deals with the rate of healing in wounds.

Transactions of the American Surgical Association. Vol. XXXV. Edited by JOHN F. BINNIE, M.D. Philadelphia: William J. Dornan. 1917. Pp. 616.

THE Transactions of this lively association continue to reach us with a regularity and a prodigality of material which can only excite jealous admiration in these times. Besides the usual clinical papers we note excellent biographies of two great surgeons, Victor Horsley and Vincenz Czerny. Of unusual interest is a topographical analysis by Dr. Edmond Souchon, of New Orleans, of America's original contributions to medical science. We learn, for instance, that Dr. E. B. Walcott, of Wisconsin, performed the first nephrotomy; that Dr. A. D. Bush, of Vermont, determined a 10 per cent. mental deficiency in tobacco users; that Dr. F. G. Novy, of Michigan, first cultivated trypanosomes. Devotees of medical history will refer to his original article.

THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

SUBSCRIPTIONS TO THE SECOND APPEAL.

THE following subscriptions have been received up to Monday last, Sept. 9th:—

	£	s.	d.
Dr. C. A. Rayne	5	5	0
Dr. Robert J. Carlisle ...	2	0	0
Sir Alfred Pearce Gould (monthly)	5	5	0
Dr. Dundas Grant	10	10	0
Mr. W. J. Sheppard ...	0	10	6
Mr. J. V. C. Penning ...	1	1	0
Dr. Edward Byrd	1	1	0
The Sunderland Pharmaceutical Association*	16	17	6
American Red Cross Commission for Belgium	200	0	0
Capt. A. P. Thom, R.A.M.C.	1	1	0
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* Per Mr. Cuthbert Hodgson.

† Second donation this year.

The munificent gift of £200 from the American Red Cross has been received through Mr. Ernest P. Bicknell, the Commissioner for Belgium, who writes: "This contribution is for the month of September, 1918, and is from the Commission for Belgium of the American Red Cross. A monthly contribution of the same amount will be made for the remaining months of the year." This timely and open-handed grant should inspire further British contributions in order that increased monthly payments may be made to Belgium.

Subscriptions to the Fund should be sent to the treasurer of the Fund, Dr. H. A. Des Vœux, at 14, Buckingham Gate, London, S.W. 1, and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund, crossed Lloyds Bank, Limited.

THE LATE DR. C. E. GLASCOTT.—Charles Edward Glascott, M.D., C.M., F.R.C.S. Edin., died recently at his residence, Budleigh Salterton, Devon. He was born in 1847 at Constantinople, and received his medical education at Edinburgh University. For 35 years Dr. Glascott was honorary surgeon to the Manchester Royal Eye Hospital. He was formerly president of the Manchester Medical Society, and lecturer and examiner in ophthalmology at Victoria University, Manchester. Since his retirement he had resided at Budleigh Salterton.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 14, 1918.

The State and Research.[1]

THE members of the Committee of the Privy Council for Scientific and Industrial Research have a heavy task in front of them, but in their third annual report, issued last week, it is shown that steady and valuable progress is being made along many important lines. It is not surprising to learn that the past year has seen a great extension of the work of what is now the important State Department of Scientific and Industrial Research, when the scope of its activities is considered. Out of the fund of £1,000,000 voted by Parliament in order to enable the Department "to enter into agreements with new industrial research associations for the payment of grants over a period of years" there has been guaranteed to the British Scientific Instrument Research Association an expenditure of £36,000 on approved research during the next five years. During the same period a grant of £1500 a year has been awarded the British Photographic Association; and research associations, having as their object the betterment of the cotton and woollen industries, have received similar awards provided that the firms concerned subscribe equal sums towards the same end. We mention these matters because, taken with what follows, they illustrate the wide range of the activities of the Department.

The Committee early in the year assumed responsibility for the maintenance and development of the National Physical Laboratory, and they have approved extensions of the laboratory which will enable the staff to undertake the testing of the higher grades of chemical glass and the testing of all clinical thermometers, whether for military or civilian use. Amongst the researches of direct medical interest is one on mine-rescue apparatus, the progress of which is being watched by the Medical Research Committee, and an obviously related research is that on respiration apparatus. It is of interest to mention that one result of these researches has shown that a man's respiratory behaviour when oxygen is administered during manual work is dependent on his physical condition. Following up this opening Dr. HENRY BRIGGS, of the Heriot-Watt College, Edinburgh, has been able to devise a method of measuring physical fitness and stamina which has been tested on a considerable number of men chosen chiefly from the Army and the mines. Apart from its bearing on the selection of men for mine-rescue teams, the method has a wider interest in affording a new means of ascertaining a man's value for the Army. The War Office authorities have recognised this fact, and the first physical testing station has been established in Edinburgh. A further interesting development of Dr. BRIGGS'S work has been an improved system of supplying oxygen for Army purposes, in which the question of the storage and supply of liquid and compressed oxygen and other gases has received particular attention.

Another pressing matter which has come before the Department has been the improvement and wholesale extension of cold storage systems, with a view to the preservation of the thousands of tons of food which are annually lost by decay before they can be sent to market. It was agreed, most wisely we think, that the investigations in this direction could be more suitably conducted by the State than by any industrial research association, and the Food Investigation Board of the Department has them in hand. The work has been well begun and a substantial sum awarded for pursuing this most important direction of research. Experiments on the freezing of fish are being conducted at North Shields, and an experimental and demonstration plant for the freezing of fish has been set up in Billingsgate Market. Another committee has been appointed to investigate on similar lines the processes for preserving meat, fruit, and vegetables, and the laboratories at Cambridge have been requisitioned for the purpose of conducting investigations into the physiology of fruit and vegetables at low temperatures and into those diseases which attack fruit in storage. Heat insulation and the influences determined by hygrometry form yet another interesting and important branch of cognate inquiry, the results of which would preserve for our use the kindly fruits of the earth, so that in due time we may enjoy them. The Board of the Department has also within its ken certain matters connected with the use of oils and fats, a veiled reference doubtless to the edible fats—margarine and butter substitutes. "Events," the report states, "have justified the rapid decisions which we took in the summer of last year, while experience has shown that the appointment of a responsible director to organise a group of researches of national importance, assisted by an advisory board of distinguished men of science and affairs, greatly facilitates prompt action and the proper coördination of all the work in accordance with a definite scheme. Research work, like other forms of creative activity, will not flourish under committee rule." Could a more scathing criticism be levelled at our past commercial methods than is contained in this pregnant sentence? The report deals with important technical problems, and while we have narrowed our review to those questions which claim obviously and particularly the attention of the medical profession, we urge such of our readers as have the necessary time to study the whole short document. It affords valuable reading because of the strong and serious effort which it discloses to bring about reforms which have long been urged upon us by our scientific leaders, and fully con firms the Report of Sir J. J. THOMSON'S Committee "to enquire into the position of natural science in the educational system of Great Britain," Professor STARLING'S review of which appears in the subsequent pages of this issue.

[1] Report of the Committee of the Privy Council for Scientific and Industrial Research for 1917-1918. London: H.M. Stationery Office. 4d. net.

Annotations.

"Ne quid nimis."

WAR NEPHRITIS.

THE growth of a child is notoriously discontinuous, and it often happens that knowledge of a new disease advances sometimes rapidly, sometimes with tiresome slowness, while apparently the same amount of work is being put into it by competent investigators. A striking example of this is given by war nephritis. The recent report of the Medical Research Committee is largely of a negative character, throwing little or no further light on the causation of the disease. Interesting additional information is, however, incidentally given.

The *first* part of the report is drawn up by the Committee on War Nephritis working in France. This shows that although the first rise in the incidence of nephritis occurred in the spring and early summer of 1915, after that time most cases occurred in the winter, the temperature curve varying inversely with the rate of incidence so closely that it can hardly be without significance. It is gratifying to learn, however, that the total numbers have never reached a figure that could be considered of importance to the strength of the Army. As each group of the new army went to France there was a rapid and uninterrupted rise in the incidence of cases in that group, reaching its highest point in about six months, after which a fall occurred, reaching its lowest point the following summer. After that the incidence curve of the group followed closely that of the whole Army. The suggestion is that the individuals naturally prone to nephritis were first attacked, leaving a more or less homogeneous residue. We might add that these results also suggest that though climatic conditions were not responsible for producing the outbreak, since it did not start till after the severe winter of 1914-15 was past, they have played a considerable part in modifying the incidence of the disease once it had started. Fortunately, the death-rate has remained low. The average annual mortality for all cases was 0·93 per cent. During 1916 only two officers died from nephritis, and none during 1917. The Committee could not find that diet, chlorinated water, metallic poisons, intestinal intoxication, previous renal disease, or illness immediately prior to the nephritis had any influence. They comment on the occurrence of cases in hospital orderlies who had never left their base hospitals, and note that the disease was not limited in its incidence to the older men. They also conclude that the severe exertion and fatigue undergone during training at the base played little or no part in its etiology.

The *second* part of the report is a clinical study by Captain O. L. V. de Wesselow and Captain H. MacLean, who found that in a large proportion of the cases the onset was comparatively insidious. The first indication in those doing heavy manual work was increasing shortness of breath; in those leading a sedentary life headache was the first symptom. The œdema tended to clear up rapidly, its disappearance being usually accompanied by a well-marked diuresis, and often by heavy sweats, so that there might be a loss of weight amounting to as much as 5 or 6 lb. in the 24 hours. With the subsidence of the dropsy the albuminuria usually improved considerably. Hyaline casts were the most abundant, granular next, and epithelial next in order of frequency. A moderate rise of systolic blood pressure was almost invariably present during the period of œdema, falling to a normal level or below it as the œdema subsided. The diastolic pressure was less affected. During the period of raised tension there was frequently a marked difference in the height of the morning and evening pressures, the latter being the higher. In the great majority of cases a very definite hydræmia could be demonstrated. Although cardiac symptoms were frequent, the only physical sign was a temporary enlargement of the heart to the left in 23 per cent. On discharge from hospital, however, the heart appeared to be normal, as judged by the ordinary methods of clinical examination. Chemical investigations showed no differences in kind between this and ordinary nephritis, but merely that it was of a milder type. Usually the chemical results ran parallel with the clinical course. In a few instances, however, the results of chemical investigation were much less grave than the immediate clinical manifestations appeared to indicate. Such cases did well. They found the urea in the blood was usually increased, while the chlorides were variable. In the two cases of fits—which recovered—the urea in the blood was not appreciably raised, whereas in a fatal case of uræmia it was exceedingly high. This is interesting as supporting the conclusion to which this outbreak has gradually been leading various observers, that the various clinical manifestations usually regarded as uræmic are not due to the same toxins, and that the most dramatic of the symptoms, the convulsions, are really the least serious.

The *third* part of the report is a laborious investigation by Captain MacLean into a possible relationship of previously existing albuminuria to war nephritis. The results are entirely negative, no such relationship being found.

The *fourth* part is a bacteriological investigation by Captain J. A. Wilson, also negative in its findings, since routine examination of the urine, blood, throat, and fæces, failed to demonstrate a causal organism.

It will be seen that these reports confirm in the main the earlier observations, such as those made at St. Bartholomew's Hospital in 1915. The chief point of difference is that whereas 30 per cent. of the earlier cases had a positive Wassermann reaction, all of 90 cases here investigated showed a negative result. The chief new point is the relationship of the incidence of the cases to climate, which was entirely lacking in the earlier phases of the outbreak. But the question as to why nephritis has been so frequent in this war and so rare in all previous wars, except the American Civil War, still remains unanswered.

In our last week's issue we published a paper by Captain S. C. Dyke mainly relating to the prognosis of this disease. He found that in 40 per cent. of his series the re-establishment of renal function was incomplete and some degree of permanent damage resulted to the general health. He held the early disappearance of œdema to be one of the best prognostic signs; its persistence after the second week made the outlook worse; while the presence of œdema after the end of the first month indicated that restoration to health would be incomplete. In the same way albuminuria continuing after the end of the third month rendered the prognosis as to complete recovery unfavourable. His suggestion is that the disease is either a primary acute nephritis or an exacerbation of a pre-existing disease induced by fatigue or exposure, and he thinks that an inquiry into the alterations of metabolism produced by fatigue would yield fruitful results. Such an inquiry has been thoroughly undertaken by Captain Macleod, and his conclusions do not support this suggestion. A paper in the *Quarterly Journal of Medicine* for January, 1918, by Captain W. H. Tytler and Captain J. A. Ryle gives as their impression an increasing doubt as to whether the kidney lesion is the primary event—whether, in fact, the nephritis is not a complication of some other disease, possibly pulmonary. That this is probable is indicated not only by the pulmonary lesions in fatal cases but by the enlargement of the spleen, which this last observer found to occur frequently. That the nephritis once thus established should be closely similar to ordinary nephritis would then be comprehensible, since nephritis is so usually the result of an infection or an intoxication. But the effect of such a cause might persist long after the cause had disappeared; hence the negative bacteriological findings. A pulmonary infection might also be expected to show the seasonal variation which the Medical Research Committee have noted.

LONELY DWELLERS AND THEIR NEIGHBOURS.

IT was stated in the newspapers recently that a woman, 73 years of age, living alone in a house in Gray's Inn-road, fell downstairs one Wednesday evening, and, being unable to move, was not discovered until the following Saturday. On the next day she died in the hospital to which she had been taken. Stories of this kind, or of solitary

persons who die and whose bodies are only discovered after some time, are not infrequent, and such cases occur in the country as well as in great cities. Probably, however, they are rarer in rural districts and small towns, where eccentric characters and the poor and lonely are of greater interest to their neighbours than they are in the metropolis. It is difficult, indeed, to suggest any means which would prevent such an occurrence in the crowded area round Holborn, nor can we say that any duty of neighbourliness was neglected by those in her vicinity who went their daily way while an old woman lay at the foot of a staircase in a house which they had no reason for entering. Nor does society, the State, or the local authority appear to be called upon to interfere if persons of mature age, whether poor or not, prefer to live alone rather than in surroundings which would expose them to observation. In the absence of organised intervention it is usually the baker, or the milkman, or the postman, particularly the last in country districts, who reports that he cannot get the accustomed answer at a certain door, when further inquiry shows that a lonely dweller is ill or dead. It might conceivably be made an instruction to postmen to be observant in such matters, and to report the non-delivery of a letter through failure to get a reply to a knock at the door. But lonely dwellers receive few letters. There remain the baker and the milkman, whose services might also be requisitioned in normal times, but even then there are many cases where the customer fetches his own bread or milk from a shop where his abode is not known. It is, indeed, likely that any such system as we have suggested, even if reinforced by the aid of the police, would not only lead to many false alarms, but would break down and be inoperative in a substantial proportion of genuine instances. Cases, therefore, such as that upon which we have commented will continue to fill us with pity, but will not be averted unless and until the State undertakes even greater surveillance over the details of our daily lives than it does at present. Do we want that?

THE SIMULATION OF MUMPS.

AT a recent meeting of the Société Médicale des Hôpitaux of Paris MM. Trémolières and L. Caussade reported a curious form of simulated disease which appears not to have been previously described. A Moroccan soldier was sent back from the front and passed in succession through seven "formations sanitaires" with the double diagnosis of mumps and hysterical crises. Probably in every hospital the first diagnosis was abandoned, but the real nature of the affection was not ascertained. From the moment he first came under the observation of MM. Trémolières and Caussade they were struck by the unusual character and evolution of the parotid swellings. They involved the retro-maxillary hollow, the neck and the pre-auricular, zygomatic, and temporal regions, giving the head a pyriform appearance. On some days the eyelids were affected, so that the features were unrecognisable. The parotid tumours were resistant, difficult to delimit, and little painful. There was no fever. The orifices of Stenson's ducts were projecting and red, and on pressure emitted a remarkably aerated saliva. One day it was noticed that the tumours were resonant on percussion and were accompanied by subcutaneous emphysema. The patient was then submitted to radioscopic examination and the purely aerial nature of the swellings was confirmed. Two days later he was surprised while forcibly blowing out his cheeks, pinching his nostrils, and applying his hand to his mouth. By inflating his parotid glands he had simulated mumps. He had even in his efforts ruptured an acinus, and the air had penetrated into the periglandular cellular tissue. The repetition of the manœuvre had led to a secondary inflammation of the gland, as was shown by the abundance of polynuclear cells in the saliva removed from Stenson's duct by catheterism. It was then ascertained that this method of simulating mumps was well-known among the Moroccan soldiers. They pricked the mucous membrane of the cheek and then blew hard into a bottle or simply closed the mouth with the back of the hand. Being ignorant of the existence of Stenson's duct, they did not know that the prick was useless. This simulation is therefore of the same nature as the parotid swellings which occur in glass-blowers and performers on wind instruments. In the discussion which followed M. E. de Massary pointed out that the simulation of mumps, whether in the parotid or the testicle, can be detected by lumbar puncture. He has found that lymphocytosis of the cerebro-spinal fluid is constant in mumps. The knowledge that such a test might be applied should stop the simulation.

TRAUMA AND IMPOTENCE.

OUR conception of the remoter results of traumatism is constantly being widened by the experiences of the war, but its effects on sexual activity have received little notice in this country. Bloch[1] divides trauma as a cause of impotence into psychical and physical. As to the former, his researches show mental depression by itself can lower sexual potency, which is always impaired in nervous diseases marked by depressive states. It has been observed that men rarely become fathers in the year of their bankruptcy. Anger, too, is antagonistic to sexual activity. The more sudden and acute the mental shock, as from scenes of bloodshed, so much the more obstinate is the impotence. In ancient and mediæval superstition magicians were credited with being able to cast a spell of impotence upon a man through the agency of fright. John Hunter related a case of impotence coming on very rapidly from fright, and the same has followed sudden bereavement of a startling kind. In the front line of a battle it is obvious that all these emotional factors have abundant play. With regard to the pathogeny of impotence thus caused, Bloch doubts whether it is purely psychical; if of long continuance, some unknown disturbance of the internal secretions, of the endocrinic system, is probably responsible. Thus a Dutch clinician recorded amenorrhœa and acromegaly in a woman 25 years old, with no abnormal family history, attributed to severe fright; and an increase of the secretion of the adrenals has been found in the blood after great mental excitement. Physical trauma may be divided into trauma to the genitals or other part of the body generally and trauma to the central nervous system. In war experience sexual paresis is often met with from the pain of an injury. If the genitals themselves have not been greatly injured the prognosis is good, potency usually returning with healing of the wound and cessation of the pain. The outlook is much worse when the cause is concussion of the brain or spinal cord, these cases being similar to the impotence and testicular atrophy long observed in civil practice as an occasional sequela to falls on the back of the head

[1] Iwan Bloch: Zeitschrift für Sexualwissenschaft, July, 1918.

or like injury. The "Scythian disease" of Herodotus and Hippocrates may have had a similar history. But the old view that injury to the cerebellum occasioned the genital disturbance has now been shaken by the work of Ceni, who describes "higher genital centres" in the cortex cerebri which exercise trophic influence upon the reproductive organs, especially upon spermatogenesis and ovulation. Experimentally produced commotio cerebri in animals has been followed by absence of libido and by parenchymatous testicular atrophy. These genital centres are described as much slower to recover from trauma than are the ordinary motor and sensory cerebral centres. Hence the long continuance of impotence following physical trauma to the central nervous system.

SANDFLY FEVER OR INFLUENZA.

IN the *Annali d' Igiene* of June 30th Professor G. Sampietro gives the reasons for the belief prevalent in Italy that the epidemic which began in the second half of last May and was prevalent in Spain and thence spread over Europe is identical with the so-called three-day fever or sandfly fever. The clinical picture of this epidemic may be thus summed up:—

Sudden onset of fever, which as a rule remained high for two or three days, accompanied by severe muscular pains, localised specially in the back and lower limbs, with headache, prostration, anorexia, and coated tongue. In some cases there were signs of pharyngeal and tracheal irritation, which rarely developed into a catarrhal condition; in others there was gastro-intestinal disturbance. Convalescence was attended with marked debility, which lasted from one to two weeks. There was no skin eruption or enlargement of the spleen. The prognosis was favourable. Pfeiffer's bacillus, which is one of the specific agents in influenza, was only exceptionally met with, but, on the other hand, the municipal laboratory at Madrid demonstrated in the secretions the frequent presence of a Gram-negative diplococcus of the type of *Micrococcus catarrhalis*. Clinically the symptoms coincide exactly with those of the disease endemic in Italy and well known among the military population as *pappataci* or sandfly fever, while the late epidemic does not resemble dengue fever owing to the absence of relapses and exanthema, nor trench fever owing to the absence of recurrences and enlargement of the spleen and the leucopenia; nor does it conform to true influenza on account of the want of symptomatic polymorphism, the typical duration, and scarcity of catarrhal elements affecting the respiratory system.

From the epidemiological point of view the diagnosis of sandfly fever derives confirmation from the fact that this fever usually prevails from the middle of May to the end of September, whereas influenza and trench fever are not epidemic in the summer. The epidemic of phlebotomus fever in Lemnos, described by Temporary Surgeon J. Lambert, R.N., in the *Journal of the R.N.M.S.* for April last had this seasonal incidence, the author taking the view that the absence of catarrhal symptoms would readily assure the differential diagnosis from influenza. The phlebotomus or sandfly is a small grey dipterous insect which makes its appearance about the end of May and disappears early in October, thus exhibiting a strange coincidence with the seasonal occurrence of three-day fever. Only the females bite during the night, their flight is inaudible, and they penetrate into bedrooms only when the atmosphere is completely tranquil, and at dawn return to their habitations in dark and damp cellars and deposit their eggs in underground localities where rubbish, wood, and vegetable detritus abound, or in dilapidated walls, gutters, and pipes. It can therefore easily be understood how difficult it is to prove the presence of the phlebotomi in any given epidemic. On the other hand, some account must be taken of the war conditions now prevalent. Everywhere a large quantity of wood, destined to supply material for the construction of defence works, barricades, and huts, has been transported, and doubtless with them also eggs of the phlebotomi, and with this accumulation of material there has been aggregation of human beings in heated barracks or factories to establish conditions favourable to the development of the phlebotomi at altitudes and in localities which might seem to be incompatible with their life. Moreover, the rapid decline of the epidemic after a sudden and rather brief period of climax is more in favour of an infection transmitted by means of insects and related to their natural history than of a disease propagated by contagion.

SOCIAL STUDY AND RESEARCH.

THE death of Sir Ratan Tata at the age of 47 years calls attention to the remarkable development of "social science" which his wise generosity did so much to foster. Mr. Jamsetjee N. Tata, whose industrial prescience in India brought him great wealth, died on the eve of endowing various useful schemes of research. His cloak fell on his two sons. The younger, Sir Ratan Tata, founded the department known by his name in the London School of Economics, and established a fund in 1912 in connexion with London University for promoting the study of the prevention and relief of destitution and poverty. Since this time social study courses have been instituted all over the country: in London, at Bedford College and King's College for Women; elsewhere in connexion with the Universities of Belfast, Birmingham, Bristol, Edinburgh, Glasgow, Leeds, and Liverpool; while courses are in contemplation at the Universities of Manchester, Sheffield, and Wales, and at the Armstrong College, Newcastle. A report,[1] drawn up by the Joint University Council for Social Studies constituted a year ago, describes this new faculty and its present status. Great stress is laid on giving the student a living insight into the various civic and social agencies of a modern town and their mutual action and reaction. There is a very welcome passage in the report which deprecates the teaching of the facts of social life without a preliminary grasp by the student of the facts of physical life. It is quite possible, the passage runs, those most interested in social education have belonged too exclusively to the school of thought which consider social well-being in relation to moral and economic health rather than to physical health. The just claim of hygiene for inclusion as an essential part of social science is now gaining ground, with promise of much greater results in the future. The Parsee community, with the Tata family at its head, has played an honourable rôle in making these results possible, and Sir Dorab Tata, the elder son of Mr. Jamsetjee Tata, is certain to follow in his father's footsteps.

Dr. Addison, Minister of Reconstruction, will speak at a meeting of the medical profession to be held at Steinway Hall on Oct. 1st, at 5.30, under the chairmanship of Sir Henry Morris. The object of the meeting is to secure the election of representative medical men to the House of Commons, so that expert advice may be available on vital questions concerning the national health. All members of the medical profession are invited to attend.

[1] Social Study and Training at the Universities. London: P. S. King and Son, Ltd. Price 6*d*.

NATURAL SCIENCE IN EDUCATION.

NOTES ON THE REPORT OF THE COMMITTEE ON THE POSITION OF NATURAL SCIENCE IN THE EDUCATIONAL SYSTEM OF GREAT BRITAIN.

BY ERNEST H. STARLING, F.R.S.,
PROFESSOR OF PHYSIOLOGY, UNIVERSITY COLLEGE, LONDON.

THE astounding and disastrous ignorance of the most elementary scientific facts displayed by members of the Government and administration alike in the early days of the war roused some doubts in the minds of the British public as to the efficiency of the education imparted at a high price to the members of the upper classes, including those who are chiefly responsible for the control of the destinies of this country. The Government adopted the traditional method of poulticing the sore place in public opinion by the appointment of two committees, one on the position of natural science in our educational system and the other on the teaching of modern languages. It is with the report of the first of these committees that we are here concerned. The Committee was under the presidency of Sir J. J. Thomson, P.R.S., and included representatives of secondary, university, professional, and technical education. The Committee was appointed in August, 1916, and the report before us is a testimony of the diligence with which the members executed their task. The Committee sat on 45 days and subcommittees on another 51 days; the report itself is dated February, 1918, and naturally a large amount of work was done by members of the board apart from meetings in committee.

Defects in Present System.

It should be noted that the title of the report is "The Position of Natural Science in Education,"[1] and the report contains a series of recommendations, which, if carried into effect, must result in a greater importance being ascribed to the natural sciences in the educational curriculum, especially in that of the general public; so that some of the blunders perpetrated through the ignorance of our rulers may possibly be avoided in the future. But ignorance of elementary chemical facts forms but a small factor in the gross deficiencies of our educational system. It is impossible to read this report without feeling that all its recommendations, even if realised, might do little for the growth of the nation if we cannot achieve at the same time a revolution in the whole aim and system of education. It is not sufficient merely to introduce natural science into the school curriculum. In many schools, in the majority in fact, it is already there. What are lacking are scientific aim and method, and the recognition by the public at large and by every class of the community of the meaning of knowledge and of science and of the part which science must play in every action taken, whether by the individual or the State. It is the absence of science and scientific method, not ignorance of chemistry, which has been responsible for our failures of leadership in the conduct of the war, whether at home or on the Western front.

In this connexion the volume of essays[2] just issued under the editorship of Professor Ray Lankester might well serve as an introduction to the report of the Committee on Natural Science. The best and most illuminating of these essays were written as long ago as 1867, at a time when there was a short period during which the British public stirred in its sleep, under the influence of the shaking up of its fundamental ideas effected by the publication of the theory of evolution, and the theological discussions aroused thereby. For the first time since the founding of the Royal Society, moreover, a royal personage had taken an active interest in the development of science in this country. Huxley's essays and addresses on education, like the essays in the collection before us, are applicable in every particular to the present day, and the question arises whether the public, under the influence of the severe lesson it has received during this war, will repent of its former sloth and apathy and, acting upon the recommendations here made, will endeavour to fit itself for the strenuous struggle for existence which will continue for many decades after the war.

It is apparent that the main defect in our present education is not so much the time that is spent on the study of Latin or Greek, but the fact that so many years are passed at school and nothing is learnt. After nine years nine-tenths of the boys can read neither Latin nor Greek. They may have acquired a few catchwords or allusions to classical mythology, but they can give no account of the manner in which the Greeks lived, of the part played by Greek philosophy or art in the evolution of modern ideas, or of the way in which Western government has been founded on Roman inventions. Though their studies have been almost entirely literary and grammatical, they are incapable of writing or speaking with ease or fluency any language, including their own. And not only have they learnt nothing which will serve as intellectual guidance in their future life, but they have had their enthusiasm for new knowledge damped and their curiosity destroyed.

Aim of Education.

If we are to make our education scientific the first requisite is to decide what we are aiming at, and then to elaborate the means by which our aims may be attained. Natural science will then fall of itself into its proper place. It can hardly be denied that the aim of education is to fit the boy for his future work and position as a member of the community. The rise of animals in the scale of life has been determined by the evolution of an educatable part of the brain, the cerebral cortex, so that the animal can control and alter the inherited mechanical responses of the lower parts of the central nervous system in accordance with the teachings of its own experience. Even in the lower animals this automatic education by individual experience is reinforced by the example and training of the parent animal, and in man the intervention of speech has rendered it possible to guide the reactions of the growing animal by the accumulated experience not merely of the parents but of the rest of the civilised world.

It is the office of education, therefore, to prepare the young for their future work by placing at their disposal such a summary and collection of the total human experience as are essential for making them efficient members of the community. All this would seem self-evident; but it does not represent the guiding principle in our education, nor is it often thought of in our public school system, although parents will make considerable sacrifices in order that they may send their boys to public schools. Nothing can be more foolish than to assume that all men are fools. Men send their sons to public schools because there are some advantages which more than outweigh under present conditions the disadvantages of a senseless method of education. It has often been stated that a boy goes to a public school because he receives there the education of a gentleman. It may be objected that this is mere snobbery, but, at any rate, if, as Frenchmen allege, "*le snobisme*" is the ruling principle of our organisation, it must be to the benefit of the newcomer into the organisation to conform to its principles.

For, however the fact may be camouflaged in leading articles and election addresses, feudalism is ingrained deeply in our constitution. The ruling classes have resisted destruction of the system by the tactful absorption of newcomers and possible rivals, so that town and country alike are still scattered with baronial castles, where the inmates, fortified by possession of birth or capital, take toll of the community. And those who cannot enter into this class have devised a method for the avoidance of over-much exploitation—namely, by the formation of guilds and associations for mutual protection and benefit. In this country, therefore, it is of the highest advantage for his worldly success that a man belong either to the ruling class, as member or retainer, or to a guild of some sort or other; and this is much more important and has a bigger influence on the welfare of the individual than any sort of education he may receive. If the boy is expected to make a career and to obtain posts (apart from the limited number which are offered as a result of a competitive examination in the dry bones of his school curriculum) his success will depend more on what he is or to what guild he belongs than on his intellectual equipment.

It is, indeed, regarded almost as a heresy to demand of a Minister special knowledge of the work which he

[1] London: Published under the authority of H.M. Stationery Office. Price 1s. 6d. net.
[2] "Natural Science and the Classical System in Education: Essays, New and Old," edited by Sir Ray Lankester, K.C.B., F.R.S. Heinemann.

is appointed to direct, and the idea of promotion by merit in the Army or other public services arouses a feeling of horror in the majority of those belonging to these services. And before the war the system seemed to work, at any rate to those who conformed to it, just as a bed of fossils may endure for thousands of years, till it is broken up by a convulsion of nature or ground up by man to make mortar. But a system in which the leaders of the community possess neither the intelligence nor the knowledge to lead must be disastrous in a time of change and stress such as that with which we are faced, and shall be faced for many years to come. The question before the nation is whether we can now finally destroy the remains of the fossil system which impedes and frustrates our best efforts in order to regenerate a living working organism, coördinated and adapted to playing its part in the struggle for survival.

The foundation stone in any such reconstruction is our educational system. If the war is successful in educating the public into the meaning of education, into the value of knowledge (and this we shall not know until our men return from the war), the nation will be ready to accept the suggestions for improvement made in this report and to use them as a means to social and national regeneration.

The Value of the Study of English.

I have mentioned above that once we have rationalised our educational aims natural science will fall into its proper place. But this place is not first in the educational hierarchy. It is universally accepted that the "three R's"—reading, writing, and arithmetic—must form the groundwork of elementary education. We do not recognise in this country that training in language and expression is a necessary precedent and accompaniment of all other education, and that we need a training in the use of our own language not inferior to that given in French in the schools of our Allies. Without appreciation of language clearness of thought is impossible, and literary form is one of the best guarantees of good reasoning. But no training in mere language is sufficient or profitable unless the mind is supplied with material to work upon. A proper training in language as the expression and symbol of things, the relations of things, the relations of men, and finally of the feelings of men, while promoting accuracy of thought and judgment, will minimise the hypnotic influence exercised on the inarticulate by meaningless catchwords and party cries.

The very fullness and perfection of the English language make it, perhaps, the most difficult to master, even by those who are English by birth and upbringing. Most of us have felt how the defect in our school training in English, or its absolute default, continually impedes the expression of our ideas, and prevents any rise out of the ruts of the commonplace. Even a scientific article could and should be beautiful in its fitness of expression, and it will not lose in its usefulness if it pleases the ear as well as satisfies the reason. The majority of our generation have not advanced in the writing of English beyond the stage which, under any proper system of education, ought to be attained by an intelligent boy of 14. But if by this age the boy had learnt not only to express himself with form and propriety, but had also studied the structure and origin of his language and the meaning of the roots, especially Latin and Greek, of the words which he uses, he could begin at 14 the study of Latin as something already half familiar to him, and in a couple of years could attain such a knowledge of this language as is at present reached only by a small minority after six or eight years of stupefying drudgery. Better still if, as Mr. W. Johnson advised in Sir Ray Lankester's volume of essays, he had learnt French with his English. Each language would teach appreciation of and help in the study of the other, and the boy would be ready to play some part in the inter-Allied activities which will replace, we hope, for the next hundred years the present reign of destruction, terror, and pain.

The value of the study of English is strongly emphasised in the Committee's report, which also points out the advantage from a practical standpoint of a knowledge of modern languages. But the report is chiefly and properly concerned, not with the reform of education as a whole, but with the changes necessary to give to the study of the natural sciences its proper importance in the general scheme of instruction. Some of the changes advocated we may now proceed to discuss.

Education in the Schools.

The bulk of the intellectual workers of the country, those who will represent the mass of public opinion, are educated in the secondary schools, and it is to the instruction carried out in these schools that the Committee devotes the greater part of its attention. The report considers in the first place the present conditions of science teaching in the secondary schools. These schools may be divided into (*a*) public schools with about 25,000 boys, (*b*) grant-earning schools with about 103,000 pupils, and (*c*) preparatory and private schools, whose name is legion, but in whose case it is impossible to give any estimate of the number of children educated. The community has, in fact, no evidence either of the number taught or of the quality of the education given, nor has it at present any means of ensuring a standard of teaching in these schools.

So far as concerns the grant-earning secondary schools, the Committee was convinced by the evidence laid before it that science occupies a position in no way inferior to any other subject in the school curriculum. The chief drawback to the training given in these schools is the absence of any power of enforcing a continuous and adequate school course. A large number of boys leave before 15 in order to take up wage-earning work, and such boys have, therefore, had the advantage of only a fraction of a course. Even in the case of those boys who stay till 16, the course in science is unsatisfactory in that it is influenced by the requirements of the university entrance scholarships, which will be competed for by a very small fraction of the total number of the boys undergoing instruction at the school. The course is only the initial stages of a plan which is never completed; the boys learn some facts in isolated chapters of science, but they have no opportunity of obtaining a general acquaintance with science.

On the other hand, in the so-called public schools, which include the 76 schools in England and Wales represented on the Headmasters Conference, the Committee find that "while the majority offer adequate opportunities for the study of science to those boys whose parents desire it, there is as a whole no general recognition of the principle that science should form an essential part of secondary education." And the evil is enhanced by the fact that a number of the brighter boys, who enter a school with a classical scholarship, altogether miss any instruction in science, this instruction on the classical side being confined to the lower forms. The establishment of modern sides has furnished an excuse for, and so augmented the neglect of science on the classical side. In this way it is especially those boys who are destined to take high positions in the public services who enter on their career without having at any time studied the rudiments of science.

The tendency of the abler boys at the public schools to pursue a classical course is due, not to any enthusiasm on the part of the boys for classical studies, but to the scholarship system, which determines their whole career. At the preparatory schools they are crammed for entrance scholarships at the public schools, and the more valuable of them are purely classical, science playing no part. Entering a public school with a good knowledge of classics, but of nought else, the next stage is the attainment of a classical scholarship at Oxford or Cambridge. As might be expected, the classical scholarship winners at the universities are largely drawn from those who have already won scholarships at the public schools. Thus, during the three years ending July 31st, 1914, the total number of classical scholarships gained from the seven chief public schools was 117, while the total number gained for science from the same schools was only 19, of which 6 were gained from one school. Of the 117 classical scholarships 85 per cent. were won by boys who had been awarded entrance scholarships on the foundations of these schools. The Committee concludes—

> "That so far there has been no general and sufficient recognition of science as an essential part of the curriculum for all boys in the public schools; that the effect of scholarship examinations both at the schools themselves and at the universities, and the inequality in the number and value of the scholarships awarded for different subjects, tell against such recognition; and that many of the ablest boys who enter the public schools pass on to the universities ignorant of science and with little or no idea of its importance as a factor in the progress of civilisation or of its influence on human thought."

Recommendations of the Committee.

In order to remedy these defects the Committee emphasises the necessity of altering the character of the existing entrance examinations both at the schools and at the colleges of Oxford and Cambridge, so as to get rid of the excessive specialisation by which the work in all subjects is marred, and of insisting that each candidate for scholarships at universities should take a second subject, so that, if presenting himself for a science scholarship, he should take history, a language, or mathematics, or, if a literary subject, he should give evidence of some knowledge of science. "It is also necessary," the report states, "that the aims and character of a modern education should be more clearly defined not only in schools, but also at universities." Such a definition of aims and character must be gleaned in the report from the scheme it lays down for primary and secondary education.

"The best preparation for any occupation or profession is a general education up to the stage reached by the average boy at the age of 16, followed, where possible, between the ages of 16 and 18 by a more specialised course on a limited range of subjects. This general education should provide normally the study of English, including history and geography, languages other than English, mathematics, and natural science. Each of these subjects should be regarded as an integral part in the instruction of both boys and girls, and a fair balance should be maintained between the time allowed to them."

The effect of the establishment of such a course would be the abolition of the division into sides now usual in the larger schools.

The efficiency of the education now carried out should be determined by making compulsory a periodical inspection under the direction of the State. This recommendation is one of the most important contained in the report. Even though it might be impossible for the State or education authorities to close a school where the education was inefficient or bad, the publication of the results of the inspection would infallibly lead, as has been shown by the experience of the Carnegie trustees in America, to the rapid disappearance of the inefficiency in private schools, which is one of the worst features in our present school system. It would also bring the force of public opinion to bear upon the antiquated curriculum still preserved in some of the so-called public schools, at the present time firmly entrenched behind their barriers of tradition and social prestige.

The general course in science from 12 to 16 should not only train the mind of the student to reason about things which he has observed for himself and develop his powers of weighing and interpreting evidence, but it should also make him acquainted with the broad outline of great scientific principles, with the way in which these principles are exemplified in familiar phenomena, and with their application to the service of man. The Committee is of opinion that the second of these functions of the scientific course has been hitherto unduly neglected; but there can be no doubt of its importance to the boy who is not going to take up a scientific career, but to whom it is essential that he should know what science means and its bearings upon the problems of everyday life. It is not necessary that our administrators or our business men should be scientific men in the ordinary acceptation of the term or that they should be acquainted with a number of facts in physics and chemistry. It is essential, however, that they should recognise that science, as the ordered summary of the whole of human experience, presents the means for solving any and every problem with which they may be faced, and that the method used in attacking scientific problems—the clear vision of the object in view, and the collection and evaluation of all data appertaining to these problems—is the only method which can lead to success in war, commerce, or industry. If the business man appreciates the meaning and capabilities of science he can always find or buy the necessary expert knowledge. In this way the nation as a whole may be brought to recognise the fundamental importance of the facts and principles of science to the right ordering of our national life. So long as our traders or manufacturers are ignorant of the veriest elements of science they can neither state their needs with definiteness or accuracy, nor can they interpret into practice or utilise the results of research.

While we must provide the requisite training and opportunities for those who are capable of advancing natural science or acting as scientific experts, it is no less important that we should secure for all who are of an age to receive it an education which will enable them to realise the vital need of a knowledge of science both for the individual and national well-being. For those boys who remain at school up to 18—and the Committee is adverse to prolonging the school period beyond this age—it is recommended that the greater part of the time between 16 and 18 should be devoted to the study of a group of subjects depending on the boy's tastes and on the career which he intends to follow. It is pointed out that the imaginative and original faculties at this period could be best trained by the intensive study of a few subjects. It is suggested that a boy should devote not more than two-thirds of the school week to work in his special subjects, the other third being spent in some other kind of study—e.g., a science student might occupy this time in English or literary subjects, while the student of classics or modern languages should give his attention to science work of an appropriate kind. For the latter class of boys the science course, so far as possible, should deal with scientific questions of general interest and should be philosophic in the best sense of the term—i.e., a study of the development of scientific thought as it has affected and affects human thought and activities.

Examinations.

University scholarship examinations are not the only factors which trammel the progressive teacher and prevent freedom of experiment and of educational development in the secondary schools. A large proportion of the pupils who stay at school until the age of 16 intend to go to the university or to take up some profession the entrance to which is an examination. Thus every school in arranging its course of study has to take into account the possibility of its students presenting themselves for a number of different examinations: Oxford and Cambridge school examinations; junior and senior locals; previous examinations; responsions; matriculation; Army entrance examinations, &c. The Science Committee proposes that all these shall be virtually abolished by the institution in each school of two school examinations, a junior and senior, the passage of which in the course of time shall admit to any university or profession. It would be obviously impossible to effect such a substitution forcibly, unless by Act of Parliament, since it would interfere with vested interests, the Englishman's Ark of the Covenant. The first school examination should take place at the completion of the general course of study, and should test the results of the instruction in English subjects, languages, mathematics, and science. It should be suitable for average pupils about the age of 16. The Committee lays stress on the importance in this examination of the closest possible coöperation between teachers and examiners. Not only should the examination be adapted to the curriculum of the particular school, but great weight should be attached to the teacher's estimate of the pupils and to their school record. It should thus be carried out in accordance with the view that examinations must be determined by curricula, not curricula by examinations. At the present time it would be for the universities to determine under what conditions they would accept the first school certificate in lieu of their own entrance examination. But it is apparent that, in all cases where a State grant is given to the university, it should be possible to prevent unreasonable conditions being made in order to save a source of income to the university in the shape of matriculation examination fees.

The second school examination would be held at the end of the more specialised course of study between 16 and 18, and it is suggested that the regulations for this examination should be framed so as to be consistent with the scheme for widening the college entrance examinations of which mention has been made above. If this second school examination is satisfactorily conducted it is to be hoped that it might be used in the place of the Intermediate examinations for the Pass Degree held at many of the universities. Students could then proceed to a university ready to undertake at once a three years' course of work for their final degree, and their work during the last two years of school would not be disturbed by having to prepare for an examination, such as the University Intermediate, not primarily designed to meet school needs.

Teachers.

The Committee recognises that the first and indispensable condition to any real improvement in the teaching of science is to ensure an adequate supply of properly trained teachers.

At present teachers are deficient both in number and quality, and we cannot expect to attract the fine type of man to whom should be entrusted the most important of all functions in our society—namely, the training of the coming generation, unless we make the teachers' profession equal in social position and material reward to the other learned professions. The Committee points out that simply to add 10 per cent. or 20 per cent. to present salaries is useless. It is not merely an improvement in the salaries that is needed, but a revolution in the attitude of the public towards the teacher. The times and conditions of his teaching should also be altered, so that he may have leisure to keep abreast with the progress of knowledge, to retain freshness of mind and outlook, and not sink into the condition of a drudge who teaches so-called chemistry and physics as if they were the Latin declensions.

If this improvement can be carried out it is evident that much more real knowledge and training can be obtained in the school years than has hitherto been the case, and the Committee therefore recommends that the upper limit of age for entrance scholarship be 13 in the case of the public schools and 18 in the case of the universities, thus cutting off from the average school life one year, which can be better spent in a more thorough training in the subjects of university study, and especially in the methods and spirit of research.

Medical Education.

In a review of this report published recently in *Science Progress* Dr. C. Mercier has spoken of it as diffident. The same epithet might be applied to nine-tenths of the reports issued by Government committees and commissions. To the English mind and habit anything savouring of revolution, at any rate with subjects with which it is familiar, is distasteful. Even the report before us only ventures to use the word "revolution" in connexion with the salaries of teachers, finance not being a matter which ordinarily concerns members of the Committee. In all their recommendations relative to the methods of education the reforms advocated, though in the right direction, are generally of the mildest description. This criticism applies with special force to the recommendations contained in the section on medical education. In this connexion the report adheres directly to the terms of its reference, and does not apparently regard anatomy and physiology, still less the science of medicine itself, as coming under the definition of natural science. It is thus concerned only with the question of entrance to the medical profession and the preliminary scientific education of the medical student.

The report strongly criticises the failure of the General Medical Council to demand evidence of instruction in or knowledge of natural science at the entrance examination, trust being placed solely in an examination which demands four subjects—English, mathematics, Latin, and an additional language, classical or modern. It points out that not only is there no guarantee that the candidate for registration has received any instruction in natural science, the bedrock of his future vocation, but there is no evidence that he has gone through a coherent educational course in any of the subjects demanded. Attention is called to the illogical procedure of the General Medical Council in professing not to register a student unless he takes Latin as one of his subjects, while accepting for registration the matriculation examination of various universities, although Latin is not a compulsory subject in any of them. The report points out that after the door has already been opened in this way it is too late to attempt to retain Latin as an obligatory subject in an examination for entrance to the medical profession. The Committee is strongly of opinion that the first school examination, including English, language, mathematics, and natural science, should be accepted as evidence of a general education sufficient to admit a student to professional instruction. It is suggested that something more than a simple pass should be required—e.g., it should be necessary to attain marks of distinction in two or more of the subjects in which he is examined at his school. In cases where boys and girls, by accident, laziness, or ill-development, have failed to reach an adequate standard in the first examination, it is suggested that they might be admitted as medical students if they continue at school and pass the second examination as well. The report favours the present policy of the Royal Colleges by which every encouragement is given to the study of the preliminary sciences, chemistry, physics, and biology, at school. It is evident that such a policy is entirely in accord with the plan already discussed of spending the years from 16 to 18 at school in specialised studies having reference to the future career of the boy or girl. In the case of students proceeding to medicine these studies would be scientific; but the report lays stress on the disadvantage of separating future medical students from the rest of the school in classes by themselves. It is an elementary but complete course in chemistry, physics, and biology which is needed by the medical student at the outset of his career and as a preliminary to the more intensive study of biological principles as contained in the discipline of anatomy, physiology, and biochemistry.

The Committee recommends that the student be allowed to present himself for the first medical examination immediately on leaving school and before entering the medical school or university, but does not take the further step of advocating the entire replacement of the first medical examination by the second school examination, though such a development is distinctly favoured in the section dealing with education in the Scotch universities. It is evident that unless this change can be effected the school curriculum in science from 16 to 18 will be spoiled by having its direction and objects determined by the needs of the external examination. In all three subjects—physics, chemistry, and biology—the present medical school and university course might be replaced by a complete two years' course at school on the same subjects, with considerable benefit to the later work of the student. Especially is this the case in biology. A training in general biological principles, developed in any direction according to the ideas and enthusiasm of the teacher at school, would be of value to the medical student. The present course in many cases is of little more value than the training in Latin grammar which does duty so often for an introduction to the study of language.

The report touches on the future supply of medical students, and insists that, in view of the shortage in the supply of medical men and the heavy expense of the medical curriculum, it is essential that more scholarships, tenable throughout the medical course, should be provided for candidates of both sexes.

University Education.

Some of the more important of the recommendations with regard to the universities have already been touched upon. Others, apart from the recommendation that compulsory Greek should be abolished at Oxford and Cambridge, relate to research and to scholarships. The high value of research, carried out under the guidance of the teacher, as an educational weapon is set out, and it is stated as desirable that a year spent mainly on research should form part of the work of university students preparing for careers concerned with science and its applications. This period spent on research should follow the course for a first degree in science. It is laid down that scholarships should be considered as distinctions, and should therefore be in the first place of merely nominal value, to be supplemented according to need, and that, where necessary, the whole cost of a scholar's education and maintenance should be thus defrayed. In a footnote to the section dealing with University Scholarships an estimate by the consultative committee as to the annual cost of education and maintenance at the university is quoted. This at Oxford and Cambridge is put at £140, and at the newer universities at £60 together with the sum required for fees. If the present cost of living remains after the war it seems likely that these estimates will have to be doubled if the holders of the scholarships are not to suffer from starvation.

The Committee remarks that the war has not only hampered their inquiry but must sadly retard the realisation of their hopes. This is surely a somewhat pessimistic attitude. If the war has done nothing else it has shown us that in matters of urgent necessity it is unprofitable to count the cost. How many millions have been spent on our new tactical weapon, tanks? Forty millions a year is given as a subsidy to keep down the price of bread. An expenditure of money equal to that devoted at the present time to the provision of gas masks for the Army would cover all the needs of education for many years to come. If only the conviction can be brought home to the nation of the urgent need of educational reform, or even revolution, for the maintenance of our place in the world, all that are required on the part of our administrators are a clear idea of the reforms necessary and courage to carry them out.

THE MEDICINAL USE OF LARD, OLIVE OIL, AND CASTOR OIL.

MEASURES have now been taken to meet as far as possible the shortage of lard, olive oil, and castor oil, methods having been devised for their discontinuance for medicinal purposes in certain circumstances. The Committee appointed by the Home Office in August, 1914,[1] to deal with questions of economy in the use of drugs during the war are now notifying the medical profession as to the supply, for medicinal purposes, of these substances, and certain similar vegetable oils, inviting their coöperation in effecting economies while submitting the pertinent suggestions which appear below. The prior claims of food-supply and munition production have for some months compelled restriction or even discontinuance of the use of the substances above named for medicinal purposes, the present position being that (1) *lard* is no longer released for medicinal use; (2) the amount that can be set free for such use of *olive oil* and of its possible substitutes, *sesame* and *arachis* oils, is uncertain; and (3) little, if any, of the quality of *castor* oil hitherto required for conformity with the Pharmacopœial standard can be used.

To obviate the resulting difficulties the General Medical Council, after consultation with the Home Office Committee, directed the alteration and amendment of the British Pharmacopœia, 1914, certain preparations being withdrawn from the Pharmacopœia until further notice, and sanctioned the use of various substitutes (see THE LANCET, April 13th, 1918, p. 543). By these alterations of the Pharmacopœia considerable latitude was accorded in the dispensing of prescriptions that contained the official preparations affected. That definite understanding on this point should be established between prescribers and dispensers the Pharmaceutical Society, acting in coöperation with a body of representative manufacturers and in consultation with the Home Office Committee, undertook the necessary experiments, and have constructed a set of war emergency formulæ which are published by the Society. (Codex Addendum, 1918.)

The following suggestions are offered by the Home Office Committee for the assistance of practitioners in prescribing, in view of the position as above described:—

Lard.

(*a*) Lard can no longer be dispensed either as such or as an ingredient of a prescription. A base consisting of 5 per cent. wool fat, 10 per cent. hard paraffin, and 85 per cent. soft paraffin is on the market, and will, it is believed, afford a suitable substitute for most cases in which lard would previously have been ordered. For some cases the practitioner may find it advisable to modify the proportions of the ingredients named. (*b*) Ointments containing lard or lard and suet are now allowed to be prepared with wool fat or paraffin or mixtures of these in place of the lard or lard and suet, which may no longer be used. The base described above (named for convenience adeps factitius) has been found to afford a satisfactory substitute in the preparation of these ointments, and war emergency formulæ containing it have been constructed. Practitioners will assist by ordering these formulæ except in special cases in which they think it advisable to modify the composition of the base.

Olive Oil.

(*a*) For olive oil sesame oil or arachis oil may be substituted, but none of these vegetable oils should be ordered avoidably. When required *for external purposes* a specially prepared mineral oil derived from petroleum (known as paraffinum liquidum flavum) is now obtainable, and will in most cases be found to afford a satisfactory substitute. (*b*) Four liniments containing olive oil have ceased to be official. War emergency formulæ containing the specially prepared mineral oil above mentioned have been devised. Liniments so prepared are on the market, and may be substituted for the former official preparations.

Castor Oil.

(*a*) For castor oil it has been found, as the result of investigations by the Medical Research Committee, that the neutralised seconds castor oil, now recognised by the Pharmacopœia and readily obtainable, affords a satisfactory substitute for the first quality oil hitherto used. (*b*) One preparation containing castor oil has been withdrawn—viz., liq. cresol saponatus. For the preparations containing castor oil remaining official—i.e., collodium flexile, lin. sinapis, and liq. epispasticus, the neutralised seconds oil will be used by the manufacturer or chemist in place of the oil previously official.

The suggestions of the Home Office Committee will be very welcome to medical practitioners. The Codex Addendum was fully dealt with in our columns last week (THE LANCET, Sept. 7th, p. 336).

[1] The present members of the Committee are as follows: Dr. J. Smith Whitaker (chairman); Sir Thomas Barlow, formerly President of the Royal College of Physicians of London, consulting physician, University College Hospital; Dr. A. Cox, medical secretary of the British Medical Association; Dr. E. Rowland Fothergill; Dr. B. A. Richmond, secretary of the London Panel Committee; Dr. F. J. Smith, physician, London Hospital; Dr. W. Hale White, physician, Guy's Hospital; secretary, Dr. E. W. Adams, medical officer of the National Health Insurance Commission, late lecturer in pharmacology, University of Sheffield.

URBAN VITAL STATISTICS.

(Week ended August 31st, 1918.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality was 11·2, against 10·4 and 10·8 per 1000 in the two preceding weeks. In London, with a population slightly exceeding 4,000,000 persons, the death-rate was 10·5, or 0·9 per 1000 above that recorded in the previous week; among the remaining towns the rates ranged from 4·0 in Swindon, 4·3 in Southport, and 4·4 in Bath, to 18·8 in Gateshead, 21·8 in Barnsley, and 26·1 in West Hartlepool. The principal epidemic diseases caused 541 deaths, which corresponded to an annual rate of 1·7 per 1000, and included 435 from infantile diarrhœa, 33 from whooping-cough, 27 from measles, 26 from diphtheria, 12 from scarlet fever, and 8 from enteric fever. The deaths from diarrhœa, which had steadily increased from 34 to 305 in the seven preceding weeks, further rose to 435, and were 123 in excess of the number registered in the corresponding week of last year; 71 deaths were recorded in London, 45 in Birmingham, 29 in Liverpool, and 21 in West Ham. The 701 cases of scarlet fever and 888 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were 9 below and 7 above the respective numbers remaining at the end of the previous week. Of the total deaths in the 96 towns 123 resulted from violence. The causes of 41 deaths were uncertified, of which 6 were registered in Birmingham, 5 in Leicester, and 3 each in London and Liverpool.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality was 9·4, against rates declining from 17·4 to 9·9 per 1000 in the six preceding weeks. The 196 deaths in Glasgow corresponded to an annual rate of 9·2 per 1000, and included 18 from infantile diarrhœa, 5 from whooping-cough, and 1 each from enteric fever, measles, and diphtheria. The 59 deaths in Edinburgh were also equal to a rate of 9·2 per 1000, and included 3 from infantile diarrhœa and a fatal case each of scarlet fever and diphtheria.

Irish Towns.—The 130 deaths in Dublin corresponded to an annual rate of 17·0, or 1·6 per 1000 below that recorded in the previous week, and included 24 from infantile diarrhœa and 2 from whooping-cough. The 96 deaths in Belfast were equal to a rate of 12·7 per 1000, and included 7 from infantile diarrhœa and a fatal case each of measles and diphtheria.

(Week ended Sept. 7th, 1918.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality was 11·9, against 10·8 and 11·2 per 1000 in the two preceding weeks. In London, with a population slightly exceeding 4,000,000 persons, the death-rate was 11·4, or 0·9 per 1000 above that recorded in the previous week; among the remaining towns the rates ranged from 1·0 in Oxford, 4·1 in Aberdare, and 4·4 in Bournemouth, to 19·5 in Sunderland, 20·0 in Dudley, and 23·0 in South Shields. The principal epidemic diseases caused 543 deaths, which corresponded to an annual rate of 1·7 per 1000, and included 431 from infantile diarrhœa, 45 from whooping-cough, 37 from diphtheria, 16 from measles, and 7 each from enteric fever and scarlet fever. The deaths from diarrhœa, which had steadily increased from 34 to 435 in the eight preceding weeks, slightly fell to 431, but were 101 in excess of the number registered in the corresponding week of last year; 91 deaths were recorded in London, 41 in Birmingham, 40 in Liverpool, 17 in Sheffield, 14 in West Ham, and 12 in Hull. Diphtheria caused a death-rate of 2·3 in Bootle and 3·5 in St. Helens. The 748 cases of scarlet fever and 875 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were 47 above and 13 below the respective numbers remaining at the end of the previous week. Of the total deaths in the 96 towns 114 resulted from violence. The causes of 32 deaths were uncertified, of which 6 were registered in Liverpool, 5 in Birmingham, and 3 each in London and South Shields.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality was 10·9, against 9·9 and 9·4 per 1000 in the two preceding weeks. The 249 deaths in Glasgow corresponded to an annual rate of 11·7 per 1000, and included 16 from infantile diarrhœa, 7 each from whooping-cough and diphtheria, and 4 from measles. The 63 deaths in Edinburgh were equal to a rate of 9·9 per 1000, and included 2 each from whooping-cough and diphtheria and 1 from infantile diarrhœa.

Irish Towns.—The 132 deaths in Dublin corresponded to an annual rate of 17·5, or 0·3 per 1000 above that recorded in the previous week, and included 23 from infantile diarrhœa, 3 from enteric fever, and 1 each from measles, scarlet fever, whooping-cough, and diphtheria. The 85 deaths in Belfast were equal to a rate of 11·3 per 1000, and included 10 from infantile diarrhœa and 3 from enteric fever.

DEATH OF DR. P. W. WILKINSON.—Percy William Wilkinson, M.B., C.M. Edin., died recently at his residence at Bere Alston, Devon, in his fiftieth year. The deceased was the eldest son of the late Rev. W. Wilkinson, rector of Week St. Mary, Devon. Dr. Wilkinson had been in practice at Bere Alston for many years and was highly respected.

Correspondence.

"Audi alteram partem."

NASO-PHARYNGEAL INFECTION AT THE ONSET OF CEREBRO-SPINAL FEVER.

To the Editor of THE LANCET.

SIR,—Major J. Dorgan, in his letter to THE LANCET of August 17th, disputing Lieutenant-Colonel M. H. Gordon's statement that "every case of cerebro-spinal fever was in reality an instance of a carrier developing the disease" makes three definite points—namely:—

1. In 41 cases of declared cerebro-spinal fever at X only 19 had meningococci in the throat. In 4 cases in London only 1 had meningococci in the throat.
2. Nine men swabbed a short time before they developed cerebro-spinal fever failed to show evidence of meningococci in the throat.
3. 520 carriers were isolated at X and none developed cerebro-spinal fever.

From these results he concludes that Colonel Gordon's statement is incorrect.

Colonel Gordon in his reply deals with point 1 by stating that negative results are of less value than positive, and "success requires special training, experience, and sometimes considerable perseverance as well." Captain Martin Flack always took two swabs. It may, however, be pointed out that these cases were examined by Professor Samut and by Captain Armstrong, of the Central C.S.F. Laboratory. The London cases were examined by Captain J. A. Glover and two were swabbed twice. That is to say, all of the cases were examined in what one might describe as Colonel Gordon's own laboratory.

Not content with this sort of criticism, he then proceeds to suggest that "a considerable proportion" of the cases in which these workers failed to find meningococci in the throat were really not cases of cerebro-spinal fever at all. Although they found Gram-negative intracellular diplococci in the cerebro-spinal fluid and isolated them in half the cases and finally agglutinated them with specific serum, he doubts the diagnosis and suggests that these cocci are "a few sterilised diplococci" introduced into the fluid from the skin of the patient's back. This is an extremely far-fetched suggestion. His position is obviously untenable when we are told that the cocci were actually grown and identified by the Professor of Bacteriology at Malta University. He could surely tell the difference between the living meningococcus and the dead staphylococcus albus.

The points 2 and 3, made by Major Dorgan, are very relevant to the discussion, but are avoided by Lieutenant-Colonel Gordon.

I may point out that Temporary Surgeon S. L. Baker and I in the Navy established precisely similar points to those indicated by Major Dorgan, with whose work we were totally unacquainted. We came to the same obvious conclusion—namely, that Colonel Gordon's statement was much too sweeping, in fact, incorrect. Our work is quite well known to Colonel Gordon. If he still wishes to maintain the accuracy of his statement, or if he wishes to convey the impression that he still maintains it, he will find his audience unsympathetic if he can bring no better argument than this.—I am, Sir, yours faithfully,

P. FILDES,
Hon. Staff-Surgeon, R.N.V.R.

R.N. Hospital, Haslar, August 17th, 1918.

A NASAL DRILL IN THE TREATMENT OF ADENOIDS.

To the Editor of THE LANCET.

SIR,—The new therapeutical departure, referred to in Dr. Isabel Ormiston's paper and in your editorial annotation of August 24th, which we owe to Mrs. E. Handcock's acumen and single-minded endeavours, is of wider significance than might appear at first sight. The beneficial action of her harmless powder and of her advocacy of a physiologically efficient use of the handkerchief for "nose-pumping" rather than nose-wiping is sufficiently demonstrated by the success of her happy thought of treating in batches the snuffling children who crowd our out-patient rooms. Naso-pharyngeal sanitation, upon which so much depends, is in the first place a mechanical proceeding, best carried out by fully utilising the viscidity of the mucus for the purpose of drawing it out from the depth in an unbroken stringy stream. Nose-blowing, as it is usually taught in the nursery, interrupts its discharge. That recommendation applies *a fortiori* to adults with more capacious mucous recesses, as those can testify who have obtained complete relief of their catarrhal troubles from her simple methods, without any need for antiseptic inhalations or irrigations as a second resort. The chief significance of this new departure is in its underlying principle: *functional treatment* for the cure of malfunction and for the timely prevention of its structural results at an early age, as well as of its reflex consequences at all ages, although by far the most formidable reflex complications belong to the spasmophilic period of early childhood. The structural results are a thickened mucous membrane, adenoid overgrowth, and tonsillar hypertrophy. The last of these, in the absence of that functional treatment, too often imposes upon us the most unphysiological of remedies, a mutilation of our perfect organism. The avoidance of tonsillectomy has been for years Mrs. Handcock's steady and confident aim. In that connexion I have availed myself of her valuable aid in one instance, and with most satisfactory results, in a little boy liable to frequent gastric upsets culminating in alarming attacks of pyrexia and tachypnœa suggestive of acute pneumonia or broncho-pneumonia. The threatened tonsillectomy has not been required, and for upwards of a year he has enjoyed perfect health, and has rapidly made up for the previous delay in his development and strength.

I am, Sir, yours faithfully,

Upper Brook-street, W., August 27th, 1918. WILLIAM EWART.

To the Editor of THE LANCET.

SIR,—I am glad to find that the non-operative treatment of adenoid growths as practised by Mrs. E. Handcock is being recognised by the medical profession. I have had many opportunities of seeing cases under her care, and the following notes may be deserving of record.

E. H., age 12. Had a severe fright when 2½ years of age, after which she complained of severe pain in both eyes and constant headaches; was treated in several hospitals for partial blindness, and was eventually told she would become quite blind. I saw her in the summer and autumn of 1913, when she first came under Mrs. Handcock's care, and she was then unable to see even large objects without the aid of glasses. There was nasal obstruction and adenoid vegetations, no discharge, breath offensive, and she complained of a nasty taste in the mouth: appetite poor, and she was anæmic. There was considerable thickening over the bridge of the nose, and also behind both ears. She was dull, stupid, and apathetic, walked badly, had night terrors, and slept very badly. The skin was harsh and dry, and she had never perspired. Feet, hands, and abdomen were always cold.

After a few weeks' treatment there was free discharge from the nose, slightly offensive, the thickening over the nose and behind the ears had almost disappeared, she could read large print without glasses, the appetite was good, she slept well, and had no night terrors. The skin was soft and smooth, and she perspired after active exercise. About six months later she looked a bright, intelligent, and normally healthy girl, and had grown considerably.

This case is a good illustration of what can be done by a skilfully applied treatment, and shows that the use of glasses in cases of defective eyesight is not always necessary. The use of the nasal powder should not, I think, come first in the matter of treatment, but should rather be considered as an adjunct to the drill and manipulations.

I am, Sir, yours faithfully,

Sept. 4th, 1918. WALTER C. BLAKER, M.R.C.S., &c.

THE TREATMENT OF WAR NEUROSES.

To the Editor of THE LANCET.

SIR,—In response to my suggestion that it would be of value if Major A. F. Hurst and Captain J. L. M. Symns could give the late, as well as the immediate, results of their treatment they state that, "from all we have been able to hear the number of relapses is exceedingly small" and "we do not know of a single man invalided from our neurological centre who has relapsed." I can only attribute this to their not having had the time or opportunity to follow up many of their discharged cases, for I have seen relapsed and uncured cases from every neurological centre in Great Britain, including Netley.

I do not suppose that your correspondents would claim that their results are better than those obtained at other centres; at any rate, my experience of several hundreds of such uncured pensioners leads me to the conclusion that all the

neurological centres get equally good early results as to the removal of symptoms, but that relapses after discharge are unfortunately very common. Anyone anxious to investigate the point will find thousands of these relapsed and uncured cases, many of them totally disabled, if he will make inquiries at the Special Medical Board, the Y.M.C.A. Special Exchange, or at the various Local War Pensions Committees.

Relapse most commonly occurs after a man has been discharged from hospital where he was under complete medical control, when he has to resume the freedom, cares, and responsibilities of ordinary life. Such a man may still figure in the hospital records as "cured," though he may, in fact, be as incapable as he was to start with, and unfortunately in a condition now confirmed and much less likely to be cured a second time by suggestion. I hold that it is as unreasonable to claim soon after the symptoms have disappeared that neurotic conditions are "cured" as it would be for a surgeon immediately to record as "cured" all the malignant growths he has partially or wholly excised.

With regard to the country host scheme, common sense suggested that neurasthenia (nervous debility or exhaustion) would be, as in years past, removed by good country food, fresh air, and reasonably guided rest and exercise. All who have to deal with these cases will, I feel sure, be glad to hear that experience confirms this view, and, that the results of the scheme are encouraging, is definitely attested by the fact that the Ministry of Pensions has just decided to extend the scheme to all areas of the United Kingdom. At the neurological centres, including Seale Hayne, excellent and indeed indispensable work is being done, but I am convinced that a "half-way house" of diminished control, such as the country host scheme provides, is a necessity if relapses are to be prevented.

I am, Sir, yours faithfully,

Sept. 7th, 1918. THOMAS LUMSDEN.

*** We understand that the scheme of the Country Host Institution, in addition to its extended use by the Ministry of Pensions, has now been accepted by the Navy for undischarged sailors. The Institution finds suitable work for the men on their return from the country.—ED. L.

WAR DEAFNESS.

To the Editor of THE LANCET.

SIR,—Dr. P. McBride asks (THE LANCET, August 24th, p. 253) for a concrete example of functional deafness—a condition which he considers to be rare—and I submit the following:—

Pte. J. R. was blown up and partially buried by a shell on Feb. 15th, 1918. He became totally deaf at once and did not lose his speech nor show other hysterical signs. There was a discharge from both ears for four weeks after the explosion. Specialists found bone conduction lost and concluded that "the site of the deafness is the labyrinth on each side." He was admitted to the Seale Hayne Military Hospital on Sept. 4th, 1918, and the following day was treated for 30 minutes by pure suggestion, with the result that he heard perfectly normally after seven months of total deafness.

Now, if on account of the discharge from the ears and the bone deafness this case had not been regarded as hysterical for fear of doing him a "very grave injustice" he would undoubtedly have been invalided from the Army totally deaf and probably would have remained so. Injustice would lie rather in not regarding all cases of concussion deafness as at least partially functional from the first.

I am, Sir, yours faithfully,

J. W. MOORE.
Captain, M.R.C., U.S.A.

Seale Hayne Military Hospital, Newton Abbot, Devon, Sept. 8th, 1918.

ANTIMONY IN BILHARZIOSIS.

To the Editor of THE LANCET.

SIR,—I can fully confirm Dr. J. B. Christopherson's results given in his paper in your issue of Sept. 7th. I began to use antimony in bilharziosis in 1912 ("Biology and Treatment of Venereal Diseases," p. 349), and have treated 23 cases with a disappearance of ova in the urine. I do not know how many cases relapsed, but one case I treated with bitartrate-potassium-ammonium-antimony oxide (antiluetin) in 1914 is well to-day. I have used three preparations: (1) tartar emetic intravenously in doses of 1–1½ gr., dissolved in 5 oz. of water, to avoid thrombosis, twice or three times a week; (2) antiluetin intramuscularly and intravenously alternately, beginning with 0·025 g. and ending up with 0·2 g.; (3) colloidal antimony, both intravenously and intramuscularly, in doses of 0·5 c.cm. to 2·0 c.cm. of a 0·2 per cent. emulsion. Alternate intramuscular and intravenous injections have given better results than using only one route. Both antiluetin and colloidal antimony appear to be more efficacious than tartar emetic. Colloidal antimony is the least toxic, but as far as can be judged not quite so potent in its action as antiluetin, but possibly much larger doses might be well stood. No preparation of arsenic in my hands has done any good, but the use of intramine (a sulphur compound) both increases the action of the metal and inhibits its toxic effect. On the precise way in which antimony works in bilharziosis (other than as an oxidising agent) I can throw no light; I only used it empirically in view of the good results obtained in other diseases caused by animal parasites, which remain uninfluenced by salvarsan. I am at present precluded from further investigating the use of antimony in bilharziosis, but hope that others will discover the best antimony compound to use.

I am, Sir, yours faithfully,

Wimpole-street, W., Sept. 9th, 1918. J. E. R. MCDONAGH.

CONGENITAL PYLORIC STENOSIS.

To the Editor of THE LANCET.

SIR,—In regard to the case report of congenital pyloric stenosis reported in your issue of June 8th, in which Dr. T. Jason Wood performed a gastro-enterostomy with a very successful result, it might be pointed out that a gastro-enterostomy is a rather severe procedure in these half-starved infants and that pylorectomy, which he presents as an alternative operation, is never indicated. Statistics show that the best results have been obtained by the "Webber operation." In this procedure the pyloric tumour is split longitudinally throughout its whole length into the muscularis mucosæ; when this layer is reached the cut edges of the tumour are drawn apart forcibly and the underlying mucosa bulges into the incision. The patency of the pylorus can then be demonstrated by expressing gas through the stomach into the duodenum. On the antero-superior surface of the tumour there is an almost avascular area and if the incision is placed in this situation little bleeding is encountered. When the constriction has been relieved in this manner nothing further is done and the abdomen is closed.

Some operators prefer to undermine the serosa on either side of the incision in the tumour and bring it over the gap in the muscular wall; this, however, does not seem to be necessary, as nature covers the base of the incision with peritoneum in a very short time. It is not uncommon to find that the distal end of the tumour almost forms an invagination into the duodenum, and in splitting the tumour the proximal part of the duodenal mucosa may be nicked by the scalpel, allowing the escape of duodenal contents. This has occurred in several of our cases, but the opening has been closed very easily by a fine chromic gut suture, perhaps reinforced by a small omental graft; no ill-effects have followed. This operation is simple, short, and meets all requirements. The post-operative shock is reduced to a minimum. The first case in the Hospital for Sick Children, Toronto, done by this method some four years ago is now apparently a normal, healthy child.

Immediately following this operation it is our routine to perform a transfusion of whole blood on the infant from either parent. This procedure gives the patient a physiological stimulus that cannot be obtained by any other means. The blood transfusion is a most valuable adjunct in treatment and, undoubtedly, has helped materially to save some desperate cases. The transfusion is done by the syringe method, giving at a maximum not more than 15 c.cm. of blood per pound of body weight of the recipient. This usually means an amount of from 75 to 100 c.cm. of blood. The difficulty of finding a suitable vein in an infant is largely obviated by using the saphenous vein over the internal malleolus, which can be felt if it cannot be seen.

In a report from the Hospital for Sick Children, Toronto,[1] by Dr. W. E. Gallie and myself, 18 cases were cited with 5 deaths. Further cases to the number of 15 have been done by this method, with 4 deaths.

I am, Sir, yours faithfully,

L. BRUCE ROBERTSON,
Major, C.A.M.C.

Toronto, Canada, August 8th, 1918.

[1] Journal of Canadian Medical Association, June, 1917.

The War.

THE CASUALTY LIST.

THE following medical officers appear among the casualties announced since our last issue :—

Killed.

Capt. W. M. Lansdale, R.A.M.C., attached Royal Berks Regiment, was a student at Guy's Hospital, London, and qualified in 1914, just after the outbreak of war. He joined up shortly afterwards.

Lieut.-Col. H. H. Moshier, Canadian A.M.C., qualified at the University of Toronto in 1909, and was professor of physiology at the University of Alberta at the time he came over with the Canadian Expeditionary Force.

Capt. W. Rogerson, R.A.M.C., attd. Royal Berks Regiment.

Capt. A. Morton, R.A.M.C., attd. Highland Light Infantry.

Died.

Capt. E. W. Waters, East African Medical Service.

Died of Wounds.

Capt. R. B. Taylor, M.C., R.A.M.C.

Wounded.

Lieut. W. M. Heald, R.A.M.C., attached Lancs Fusiliers.
Capt. G. Kirkhope, R.A.M.C., attached Dragoon Guards.
Capt. A. H. Wallace, Canadian A.M.C.
Capt. D. J. Evans, R.A.M.C., attached Tank Corps.
Capt. W. D. Newland, R.A.M.C.
Major M. A. Power, M.C., R.A.M.C.
Capt. J. R. John, R.A.M.C., attached Sherwood Foresters.
Capt. D. F. Riddell, R.A.M.C., attached Cheshire Regiment.
Capt. A. K. Forbes, R.A.M.C., attached Coldstream Guards.
Lieut. W. P. Nelson, R.A.M.C., attached London Regiment.
Capt. L. H. H. Boys, R.A.M.C., attd. Royal Warwick Regt.
Lieut. T. Davies, R.A.M.C., attached Dorset Regiment.
Major W. Murdoch, M.C., R.A.M.C.
Major J. McL. Pinkerton, M.C., R.A.M.C.
Capt. E. C. A. Smith, R.A.M.C., attached Lancs Fusiliers.
Major G. H. R. Gibson, D.S.O., Canadian A.M.C.
Capt. H. G. Young, D.S.O., Canadian A.M.C.

Previously reported Missing, now reported Prisoners in German Hands.

Capt. C. C. Jones, R.A.M.C.
Capt. F. H. McCaughey, R.A.M.C., attd. North'd Fusiliers.
Capt. W. A. Rees, R.A.M.C.

THE HONOURS LIST.

The following awards to medical officers are announced :—

K.C.V.O.—Maj.-Gen. W. G. A. Bedford, C.B., C.M.G., A.M.S.

C.M.G.—Lt.-Col. P. W. O'Gorman, I.M.S.; Lt.-Col. R. T. Brown, D.S.O., R.A.M.C.

To be Brevet Major.—Capt. (temp. Maj.) W. E. Marshall, M.C., R.A.M.C.

D.S.O.—Maj. W. McConaghy, R.A.M.C.; Maj. R. S. Kennedy, M.C., I.M.S.; Temp. Lt.-Col. A. G. P. Gipps, R.A.M.C.; Maj. R. B. Purves, R.A.M.C.

Military Cross.—Temp. Capt. P. L. T. Bennett, R.A.M.C.; Temp. Capt. H. W. Hodgson, R.A.M.C.

BROUGHT TO NOTICE.

The names of the following medical officers have been brought to the notice of the Secretary of State for War for valuable services rendered in connexion with the sinking or damage by enemy action of hospital ships, transports, and store ships. All are members of the R.A.M.C. :—

Lt.-Col. H. S. Anderson, C.M.G.; Temp. Capt. P. L. T. Bennett; Temp. Capt. T. L. Butler; Maj. W. S. Crosthwait; Temp. Capt. E. G. Fenton; Temp. Lt.-Col. A. G. P. Gipps; Temp. Capt. J. H. Glover; Temp. Capt. P. Gully; Temp. Capt. H. W. Hodgson; Temp. Maj. W. E. Home; Temp. Capt. H. S. Moore; Temp. Capt. (acting Lt.-Col.) W. Penberthy; Maj. J. H. E. Priestley, C.M.G.; Maj. R. B. Purves, attached Yeomanry; Temp. Capt. J. L. Rentoul; Temp. Capt. J. Robertson; Temp. Maj. G. S. Samuelson; Temp. Capt. R. A. Shekleton; Temp. Capt. H. Slater; Temp. Lt. R. H. Thomson; Temp. Capt. T. Tierney; Capt. C. B. W. Wilmot.

MENTIONED IN DESPATCHES.

In a despatch received from the Commander-in-Chief of the Mesopotamia Expeditionary Force, dated April 15th, 1918, the following reference to the medical service occurs :—

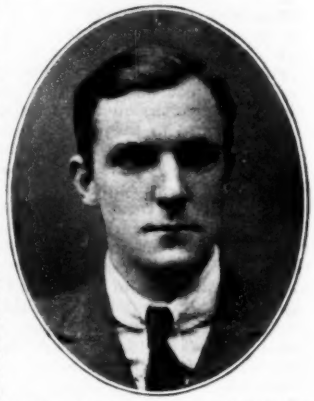
The high standard of efficiency displayed by all ranks of the Medical Service has been most gratifying to me, and reflects great credit on Surgeon-General A. P. Blenkinsop, C.B., C.M.G., my Director of Medical Services. The health of the troops has shown marked improvement as compared with the corresponding months of 1916–17. The sanitary organisation and administration has steadily progressed, and the standard of comfort and efficiency of the hospitals is most satisfactory.

OBITUARY OF THE WAR.

DOUGLAS TAYLOR, M.B., CH.B. GLASG.,

LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant D. Taylor, who died on active service on July 26th, at the age of 23 years, was only son of the late John Taylor, M.D., of Whiteinch, Glasgow. He was educated at Glasgow High School, entering Glasgow University in 1912 and graduating M.B., Ch.B. five years later after a successful academic career. During his final year of study he acted as clinical assistant at Govan District Asylum, Hawkhead. On graduating the state of his health at first prevented him from joining the R.A.M.C., and he accepted an appointment for several months as medical officer in the district of Torridon, Ross-shire. On receiving his commission later he was sent to the Near East last June, and while engaged in work at a base hospital he contracted dysentery and malaria, from which he died in hospital at Salonika. Described as a student by nature and of a kind and sympathetic disposition, Lieutenant Taylor had given promise of filling an honourable place in the medical profession.



GEORGE HELY-HUTCHINSON ALMOND, M.A., M.B. OXON.

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain G. H.-H. Almond, who was killed in action on August 9th, at the age of 41 years, was only surviving son of the late Hely-Hutchinson Almond, sometime headmaster of Loretto. He was educated at Edinburgh Academy, Loretto, and Oxford, where he took honours in science in 1902, going on to St. Bartholomew's Hospital, London, for his clinical studies and qualifying M.B., B.Ch. Oxon., in 1908. He held a number of resident hospital appointments in London before settling in practice at Bath, where he became honorary pathologist to the Royal Mineral Water Hospital and assistant pathologist to the Royal United Hospital. He had as a student served in the Yeomanry during the South African War, and in 1915 he received a commission in the R.A.M.C., going out as a pathologist. Captain Almond's careful work as a pathologist was well known to his fellow-workers. One of his colleagues at Bath writes of his "infinite capacity for taking pains," and his published work in the *Bristol Medico-Chirurgical Journal* and our own columns testifies to this faculty. A study which he made of the joint fluids in arthritis awaits publication. The equipment of the Bath laboratories owes much to his enthusiasm. His chief at a London Hospital writes to us at length of his personal qualities. "He loved his work; he was skilful and careful; he was unfailingly gentle and courteous to his patients; he worked well and

happily with everybody." Both correspondents speak of Captain Almond's forgetfulness of self and self-interest, which made his life tell on other men's lives. Captain Almond was married to a niece of the late Sir William MacCormac, and leaves a widow and three sons.

LIONEL ARTHUR MARTIN, M.R.C.S. ENG.,
SURGEON, ROYAL NAVY.

Surgeon L. A. Martin, who was accidentally killed at sea at the age of 31 years, was youngest son of Edward F. Martin, M.D., of Weston-super-Mare. He was educated at St. Peter's School, Weston-super-Mare, and at Epsom College, where he was a keen member of the O.T.C. Commencing his medical studies at University College, London, in 1905, he took the qualification of the Conjoint Board in 1912, and was about to take the Final M.B. Lond. when war broke out. He at once resigned his appointment as house physician at University College Hospital to join the Navy, and was appointed surgeon to H.M.S. *Vindictive* in August, 1914, serving with her to July, 1916, when he was appointed to H.M.S. *China*. His death occurred suddenly in the pursuance of his duties through an accident to one of the ship's boats.

Surgeon Martin's senior M.O. writes of his value as an organiser in working the sick bay staff and looking after the general administration of the hospital. His untiring energy and perserverance were always at the disposal of his seniors, and his loss will be hard to fill.

DAMER HARRISSON, F.R.C.S. EDIN.,
M.CH. (HON. CAUSÂ) LIVERP.,
COLONEL, A.M.S.

Colonel Harrisson, whose death we recorded last week, joined the surgical staff of the David Lewis Northern Hospital of Liverpool in 1882 and retired in 1913, returning to active work again when war broke out. He had risen to the position of surgeon lieutenant-colonel in the Lancashire Hussars, and was recently administrative medical officer of the West Lancashire Territorial Division. As a recognition of his services in this capacity he was made honorary surgeon to the King. He had held a number of teaching and other appointments; he was university lecturer on clinical surgery and medical officer to the special schools for defective children. His published work was on the surgery of the brain and nervous system.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported:—

Major A. R. Carter, R.G.A., attached R.A.F., died of wounds, third and youngest son of Dr. G. Carter, of Sheffield.

Second Lieut. J. Y. P. Jones, Welsh Regiment, killed in action, only son of Dr. J. Jones, of Clydach, Swansea Valley.

Capt. J. A. Summerhayes, Labour Corps, attached Inniskilling Fusiliers, killed in action, eldest son of Lieut.-Col. J. O. Summerhayes, D.S.O., R.A.M.C. (T.F.), of Thame, Oxon.

Capt. W. M. Lansdale, R.A.M.C., killed in action, son of Dr. W. Lansdale, of Grove Park, Lee, London.

Second Lieut. E. J. Mortis, Royal Guernsey Light Infantry, reported missing, now reported killed in action, younger son of Dr. H. E. Mortis, of Kinnerley, Oswestry.

Lieut. T. F. H. Torney, killed in action, only son of Captain H. Torney, R.A.M.C., of Cowbridge, South Wales.

Capt. B. C. Hall, Manchester Regiment, killed in action, only surviving child of Dr. H. Strange Hall, of Leigh, Lancs, medical officer of the Leigh Auxiliary Medical Hospital.

Obituary.

ROBERT SAUNDBY, M.D. EDIN., F.R.C.P., LL.D. (HON CAUSÂ) MCGILL AND ST. AND., M.SC. BIRM.,
EMERITUS PROFESSOR OF MEDICINE, BIRMINGHAM UNIVERSITY; LIEUTENANT-COLONEL, R.A.M.C.(T.)

THE death of Dr. Robert Saundby on August 28th of heart trouble, from which he had long suffered, removes a man of dominant personality, who had for long been a leader of the medical profession in the Midland counties.

Robert Saundby was born in London on Dec. 9th, 1849, and began his career as a tea-planter in the East until obliged by ill-health to return to England. On his voyage home the suasion of a medical fellow-passenger turned his thoughts in the direction of medicine, with the result that he entered Edinburgh University, taking the degrees of M.B., C.M. in 1874, and of M.D. three years later. After qualifying, he was for a time resident physician to the Royal Infirmary at Edinburgh, and house physician to the City Chest Hospital in London before his appointment in 1876 as pathologist to Birmingham General Hospital, which began his association with the city where he spent the 40 years of his active professional life. In the following year he was appointed assistant physician, becoming full physician in 1884, and only relinquishing office in 1912 to become consulting physician. His first teaching appointment was that of lecturer on comparative anatomy at the Queen's College, Birmingham, which he relinquished to become professor of medicine at the Mason University College, merged later in the University of Birmingham. He was in succession Bradshaw, Middlemore, and Ingleby Lecturer, and last year delivered the Harveian Oration at the Royal College of Physicians of London. He was president of the Birmingham Medical Institute, and a vice-president of the British Medical Association, and for 12 years the representative of Birmingham University on the General Medical Council.

It was to his public work that Saundby gave the greater part of his time, and the broader interests of hospital and university prevented him from acquiring a consulting practice commensurate with his ability. He was extraordinarily scrupulous in the performance of his hospital duties, spending many hours each week in the wards, where his wide knowledge of medical literature and his close familiarity with current French work made his teaching of special interest. He never neglected the less interesting cases; but in any discussion on the history of a disease or method of practice he would often reveal an astonishing acquaintance with out-of-the-way facts. He had a sound knowledge of pathology, and was a constant attendant at post-mortem examinations, while his judicial mind, unswerving in the pursuit of truth, fitted him well for original research when he had time to undertake it. His writings, without being highly original, are in the nature of well-digested presentation of fact, amplified by personal experience.

In his relation to students Saundby set a very high standard as examiner, making the M.B., Ch.B. Birmingham a degree hard to obtain, and therefore the more valued. To the less painstaking or less conscientious student his searching questions in ward or examination hall were something of an ordeal. Saundby tolerated no slipshod answer, no looseness of thought, no slovenly case-taking. But as intimacy grew the student's fear changed to affection, and Saundby commanded in a very high degree the respect of his colleagues. He was not an easy man to oppose, and was naturally impatient of stupidity or ignorance, with a hot temper which did not suffer fools gladly. In consequence his actions sometimes made him unpopular, but no one ever accused him of seeking his own, and time often proved him right and his actions to have been in the best interest of his profession. His code of medical ethics, embodied in a series of lectures which were re-published, was a noteworthy contribution to medical practice.

His earliest published work dealt with diabetes and Bright's disease, in which he always maintained his interest. He was one of the founders of the *Midland Medical Journal* and its editor in early days. He translated Ewald's "Diseases of the Stomach" for the Sydenham Society and was himself one of the first to give immediate feeding to cases of gastric ulcer. With his colleague, Gilbert Barling, he paid much attention to the surgical treatment of gastric diseases, and was specially helpful to patients in laying down

sound dietetic lines and general advice upon their mode of life. His clinical perspicacity pointed out the identity of ulcerative colitis with sporadic dysentery, while unusual cases of disease rarely escaped him, a description of the first recognised case of acromegaly in England being from his pen. His last work, on "Old Age," reveals ripe judgment and experience. As he became older his mind remained fresh and receptive, enabling him to deal fairly with the work of younger men and to find its appropriate niche for each new fact.

The passing of Saundby leaves behind the memory of a strong and unselfish man whose life was spent for the good of his profession and the enhancement of its influence on the life of the nation. A staunch friend, a foe to injustice and deceit, a man retiring by nature but whose sense of duty obliged him to overcome his shrinking from publicity—these are the traits by which he will be held in honoured remembrance.

Dr. J. W. Russell writes:—

"Dr. Saundby was a man of strong personality. His clinical work was essentially scientific. His reading was wide, and he had an extensive knowledge of contemporary research; this he applied in the wards of the hospital and in his private practice. He was keen to test for himself any new method of investigation or treatment, judged it carefully and critically, and rejected or retained it according to the result. To work under him was to learn thoroughness of investigation and the application of strict methods of thought. Above all, he set a fine example of loyalty and devotion to his hospital work. During many years of his active service he rarely missed a daily visit, and the least interesting of his cases had from him all that he was able to give.

Dr. Saundby was a keen critic. His mental grasp was clear and rapid, and he saw at once the weak points of an argument, as well as the right course to take in any difficult public matter. For this reason he was looked to in many ways as the leader of the profession in Birmingham, and as a guide in matters of medical policy, whilst his advice was frequently sought in private difficulties. During the formation of the University he played an important part in laying down the policy of the medical faculty, and he brought great dignity to the chair of Medicine. He was hardly a great teacher: he learned so easily himself that he failed to some extent to understand the difficulties of the ordinary man. But those who followed his work, and especially his house physicians, learned great lessons from him, and many of his younger colleagues have cause to remember with gratitude the encouragement and help given them in their early years.

His personal character was exceedingly fine. The quickness and certainty of his mental processes made it at times difficult to put up with opposition and dissent, and a certain irritability of temperament gave rise to occasional misunderstandings. But those who knew him best realised how little all this really meant, and of what warmth of affection and loyalty of friendship he was capable. The outstanding point in his character was a great uprightness and honesty, and the single-mindedness with which he pursued his ideals. These were high, both in public and private matters, and they were never lowered to suit his convenience. He never tolerated what he thought wrong, and took his own straight course entirely regardless of, and often in direct opposition to, his own interests. In Dr. Saundby the profession has lost a strong and sincere man and a real leader."

Dr. Saundby married in 1880 Mary Edith Spencer, of Wolverhampton, and leaves a daughter and two sons. A third son was killed last year in the Royal Flying Corps.

WILLIAM REID, M.D. ABERD.

Dr. William Reid, superintendent for more than 25 years of the Aberdeen Royal Asylum, died at Lochhead on Sept. 3rd. The son of the late Rev. William Reid, minister of Auchindoir, he had a distinguished career at Aberdeen University along with his two brothers, Robert W. Reid, now Regius professor of anatomy in the University, and the late Major-General Sir A. J. F. Reid. Graduating in 1876, he almost at once became junior assistant to Dr. Jamieson, who was then medical head of the asylum, and succeeded him on his death 15 years later. During his term of office he saw the great institution reconstructed at a cost of £50,000, with the addition of a branch asylum at Daviot. The success of this vast undertaking owed much to Dr. Reid's able administration. He was responsible for the introduction of female nursing on both sides of the asylum, a measure which, at the time, was severely criticised. Dr. Reid was also lecturer on mental diseases at the University of Aberdeen. Socially, he entered with zest into the corporate life of the University. Dr. Reid was married to a daughter of William Bruce, of Dingwall, who with two daughters survives him.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

THE following appointment has been notified: Temp. Surg. N. MacLeod to *Africa*.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Probnrs. C. C. Mackinnon (temp.) to *Crusader* and M. W. Kemp to *Swift*.

To be Surgeon Probationer (temp.): S. A. Gunter.

ARMY MEDICAL SERVICE.

Temp. Col. T. Sinclair, C.B., relinquishes his commission, and is granted the honorary rank of Colonel.

Temp. Major A. W. Robertson, R.A.M.C., to be a temporary Deputy Assistant Director-General.

Capt. and Bt. Major (acting Lieut.-Col.) C. H. S. Frankau, D.S.O., to be temporary Colonel whilst specially employed.

The undermentioned temporary Lieutenant-Colonels to be temporary Colonels: H. Wade, D.S.O. (Captain, R.A.M.C., T.F.), C. C. Choyce, R. Davies-Colley.

ROYAL ARMY MEDICAL CORPS.

E. H. Paddison relinquishes his commission and is granted the honorary rank of Captain.

Temp. Lieut. C. L. Forde to be temporary Captain.

J. R. H. Walker, late temporary Captain, is granted the honorary rank of Captain.

Temp. Hon Lieut. S. H. Kagan to be temporary honorary Captain.

Temp. Lieut. G. F. Hunter relinquishes his commission on account of ill-health contracted on active service, and is granted the honorary rank of Lieutenant.

E. Miskin, late temporary Lieutenant, is granted the honorary rank of Lieutenant.

R. P. Mitchell to be temporary Honorary Lieutenant whilst serving with the British Red Cross Society in France.

The undermentioned Majors relinquish the acting rank of Lieutenant-Colonel on re-posting: J. M. H. Conway, D.S.O., W. F. Ellis.

The undermentioned to be acting Lieutenant-Colonels:—Whilst specially employed: Temp. Major H. F. Woolfenden, Capt. M. P. Leahy. Whilst in command of a Medical Unit: Temp. Capt. (acting Major) J. G. Johnston, Major T. S. Coates, O.B.E., Major W. F. Ellis, Major (Bt. Lieut.-Col.) G. Ormrod.

The undermentioned temporary Captains relinquish the acting rank of Major on re-posting: J. M. Forsyth, H. Goodman, V. L. Connolly, J. H. Porter.

Temp. Major H. H. Serpell relinquishes the acting rank of Lieutenant-Colonel on re-posting.

The undermentioned temporary Captains relinquish their commissions and are granted the honorary rank of Captain: C. S. Bowker (on account of ill-health), C. Townshend (on account of ill-health contracted on active service).

The undermentioned temporary Captains to be acting Majors: W. G. Johnston, M.C., H. Goodman, J. W. C. Gunn, G. W. Smith, M. N. Perrin, E. S. Sowerby, J. H. Porter, E. L. Puddicombe (whilst specially employed).

F. H. Scrimgeour to be a local Major and to be granted the pay and allowances of a Major whilst specially employed.

The undermentioned Lieutenants (temporary Captains) to be Captains: F. J. Hallinan, T. J. L. Thompson, S. Robertson, J. H. Baird, W. D. Anderton, W. L. E. Reynolds, A. G. P. Hardwick, H. A. Rowell, (acting Major) W. K. Campbell, D.S.O., (acting Major) O. B. Pratt, J. H. Boag, C. G. G. Keane, C. R. Dudgeon, (acting Major) H. E. A. Boldero, R. C. Matson, H. R. Sheppard, (acting Major) W. T. Hare.

The undermentioned to be temporary Captains: Temp. Lieut. E. G. Pringle, H. Devine (whilst specially employed).

Temp. Lieut. A. V. Moberly relinquishes his commission on account of ill-health.

Temp. Lieut. H. J. Brewer relinquishes his commission on account of ill-health, and is granted the honorary rank of Lieutenant.

The undermentioned Lieutenants to be Captains: H. N. Pritchett, W. J. Walters, G. F. Mitchell, G. K. Fulton, W. Adams, R. Aitken, T. Fleming, J. S. Martin, N. Macklllop, W. Dempster, E. P. Irving, J. H. Shearer, W. McWilliam, J. Ashforth, J. S. Craig, H. E. Charles, C. H. Smith, P. Shillito, N. Pick, G. F. Hurst, H. V. Horsfall, J. H. Parker, S. Adler, P. V. Anderson, H. J. Rice, J. M. Savage, J. B. Kirk, D. McEachran, J. C. Burns, S. L. Smith, J. O. P. Smith, L. Walker, J. McI. H. Smellie, R. Mailer, W. A. Weatherhead, C. B. B. Reid, J. S. Bow, D. W. McLean, R. Andrew, J. H. R. Smith, B. W. Jones, R. J. L. Fraser, A. B. Austin, P. F. A. Grant, A. B. McA. Lang, F. W. Sandeman, D. S. Mitchell.

The undermentioned to be Lieutenants: T. H. Almond, from Manchester University Contingent, O.T.C.; A. E. B. Paul, from University of London Contingent, O.T.C.

SPECIAL RESERVE OF OFFICERS.

Capt. W. F. McLean to be acting Lieutenant-Colonel whilst in command of a Medical Unit.

Capt. F. R. H. Molian to be acting Major.

Capt. C. H. Thomas relinquishes his commission on account of ill-health, and is granted the honorary rank of Captain.

The undermentioned to be Lieutenants:—Second Lieut. E. J. S. Bonnett, from Unattached List, T.F., and F. R. G. Heif. From University of London Contingent, O.T.C.: T. Patterson, S. A. Withers, and W. A. Flynn. From Edinburgh University Contingent, O.T.C.: C. Simpson and D. C. Lamont.

TERRITORIAL FORCE.

Capt. E. D. Macnamara relinquishes his commission on account of ill-health, and is granted the honorary rank of Major.

The undermentioned Lieutenants to be Captains: B. M. Brander, R. C. Davie, C. M. Smith.

Capt. A. H. Falkner to be Major.

The undermentioned Captains to be acting Majors whilst specially employed: J. A. Davies, P. R. Bolus.

Capts. P. N. Cave and V. A. P. Costobadie relinquish their commission on account of ill-health and are granted the honorary rank of Captain.

Lieut. (temp. Capt.) W. Gilliatt and J. H. Ryffel to be Captains.

Lieut. C. W. Yates to be Captain.

The announcement regarding Capt. (temp. Major) J. Hamilton which appeared in THE LANCET of August 3rd is cancelled.

Major W. Broadbent is seconded for service overseas.

Capt. F. J. Wethered is retired under para. 116, T.F. Regulations, and is granted the honorary rank of Captain.

ROYAL AIR FORCE.

Medical Branch.—The undermentioned are granted temporary commissions as Captains: W. G. Helsby, A. Bradford, J. N. Macdonald (late Captain, R.A.M.C.). T. M. Davies is granted a temporary commission as Lieutenant.

Medical Branch (Administrative).—H. J. Beale is granted a temporary commission as Second Lieutenant.

Dental Branch.—A. Williams is granted a temporary commission as Lieutenant.

OVERSEA FORCES.

Canada.

Temp. Majors W. G. Turner and A. L. Johnson to be acting Lieutenant-Colonels whilst specially employed.

Temp. Capt. W. L. Mann to be acting Major whilst specially employed.

Temp. Major G. S. Mothersill, D.S.O., to be temporary Lieutenant-Colonel.

Temp. Major W. A. G. Bauld to be acting Lieutenant-Colonel.

Temp. Capts. W. J. E. Mingle and F. E. Pettman to be temporary Majors.

Temp. Capt. J. Seager to be acting Major.

The undermentioned temporary Lieutenants to be temporary Captains: F. H. Nelson and E. N. Ballantyne.

South Africa.

Temp. Capt. C. F. Beyers relinquishes his commission.

INDIAN MEDICAL SERVICE.

To be temporary Colonel while holding an appointment as A.D.M.S.: Lieut.-Col. J. C. Robertson, C.M.G., C.I.E.

Majors to be Lieutenant-Colonels: H. Kirkpatrick, F. D. S. Fayrer, P. K. Chitale, T. Hunter, W. R. Battye, D.S.O., G. Hutcheson, W. G. Liston, C.I.E., H. Boulton, (Bravet Lieut.-Col.) R. W. Anthony, E. F. G. Tucker, G. E. Stewart, F. S. C. Thompson, T. S. Novis, J. W. Watson.

To be acting Lieutenant-Colonel: Major H. A. Williams.

Captains to be Majors: K. G. Gharpurey, P. S. Mills, D. C. V. FitzGerald, R. S. Kennedy, B. Higham, P. Heffernan, F. P. Wernicke, H. S. Hutchison, R. G. G. Croly, S. T. Crump, J. MacG. Skinner.

Temporary Lieutenants to be temporary Captains: L. M. Banerjee, U. L. Desai.

Temporary rank of Lieutenant in the I.M.S. has been granted to the undermentioned: Sasir Chandra Chatterjee, Manikeith Vythi Menon, Kshetra Mohan Ray, Bhuthapuri Krishnayya, Kalidas Bagchee, Leonard Philip Samarasinha, Kilolane Lawrence Singer, Alfred Ba Thaw, Rustam Jamshedji Tata, Khan Sahib, Ravu Venkata Rau, Annasamy Muthukrishnan, Sadashiva Chintamon Lele, Jagdish Chandra Gupta.

The King has approved the grant of the temporary and honorary rank of Lieutenant in the I.M.S. to the undermentioned: Chandi Pershad Trivedi.

The services of the following officers of the I.M.S. have been dispensed with: Temp. Lieut. Bishendas Soni (in consequence of medical unfitness), Temp. Lieut. Rash Behari Datta (in consequence of ill-health).

The transfer to the Temporary Non-effective List of the following officer has been approved: Major P. Heffernan (in consequence of ill-health due to field service).

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

The opening article in the July issue of this journal discusses toxic action of carbonic and other weak acids on the meningococcus, Dr. J. A. Shaw-Mackenzie, the author, incidentally suggesting that CO_2 might also be made use of in syphilis of the central nervous system and in diseases due to protozoa. In observations on 250 cases of gunshot wounds of the peripheral nerves Major C. Noon comes to the conclusions, amongst others, that the diagnosis of an injury to a peripheral nerve ought to be made at the earliest possible time; that operations on injured nerves should only be done in well-equipped general hospitals, and by those surgeons who have ample experience in such cases; and that the extreme gravity of an injury to a peripheral nerve is not sufficiently realised by the general profession. An abridged version of this article has already appeared in our columns. The first part of a joint paper by Colonel G. T. Rawnsley, C.M.G., Lieutenant-Colonel H. A. Cunningham, and Captain J. Warnock on the Prophylaxis of Malaria is also contained in this issue of the journal, and Lieutenant-Colonel Gordon Holmes's article on the Symptoms of Acute Cerebellar Injuries as observed in Warfare is continued.

It is announced that medical officers of the Fleet who are carrying on the duties of a dental surgeon in addition to their proper duties as surgeons have been granted an allowance of 3s. a day, to take effect from August 8th last.

Medical News.

POST-GRADUATE COLLEGE, WEST LONDON HOSPITAL.—During next week clinics will be held each week-day at 2 P.M., Wednesday, Friday, and Saturday also at 10 A.M.

RABIES.—A case of rabies in a dog at Plymouth has been confirmed by the Board of Agriculture and Fisheries. Several suspicious cases have been reported and are now under investigation by the Board. In view of these circumstances, and as in more than one instance persons have been bitten by suspected dogs, the Board have made an Order prohibiting the movement of dogs out of Devon and Cornwall and requiring the control of dogs within a large area of those two counties. The public are warned that if in any case symptoms suspicious of rabies are observed the police should at once be notified.

THE BELL FUND.—Dr. S. A. Kinnier Wilson asks us to acknowledge donations to the Dr. J. H. Bell Fund from Dr. J. Dundas Grant (£2 2s.) and Mr. W. Gilchrist Burnie (£5 5s.). Subscriptions should be sent to Dr. Wilson, at 14, Harley-street, London, W.1.

UNIVERSITY COLLEGE, LONDON.—Dr. G. D. Thane, Professor of Anatomy, has been appointed Dean of the Faculty of Medical Sciences, Dr. J. P. Hill, F.R.S., Jodrell Professor of Comparative Anatomy, remaining Vice-Dean.

DEVON INSURANCE COMMITTEE.—At the last meeting of the Devon Insurance Committee it was reported that there were 111,594 insured persons in the county, and about 98,000 of these were receiving medical benefit.

THE appointment of Mr. R. R. Cruise, C.V.O., F.R.C.S., to be Surgeon Oculist to the King has been cancelled and the following appointments are now announced: Sir George Anderson Critchett, C.V.O., F.R.C.S. Edin., to be Surgeon Oculist in Ordinary to His Majesty and Mr. R. R. Cruise to be Surgeon Oculist Extraordinary to His Majesty.

AN Order in Council directs that the Military Service (Conventions with Allied States) Act, 1917, shall have effect with respect to the United States and American citizens. American citizens in Great Britain are now liable to military service in the same manner as British subjects, and will have the same right in regard to exemption, application for which must be made before Oct. 4th. The tribunal is the same as for British subjects, except for the County of London, when application should be made to the special Local Tribunal for London, 171, Temple Chambers, Temple Avenue, E.C. 4.

Appointments.

BADGEROW, GEORGE W., C.M.G., F.R.C.S. Edin., has been appointed Aural Surgeon to the Royal Normal College and Academy of Music for the Blind.

MAYNE, B. J., L.R.C.P. Lond., M.R.C.S., Public Vaccinator for the Illogan District by the Redruth (Cornwall) Board of Guardians.

Vacancies.

For further information refer to the advertisement columns.

Aberdeen Royal Asylum.—Med. Supt. £1000.

Ashton-under-Lyne District Infirmary, Lancashire.—H.S. £200.

Barnsley, Beckett Hospital.—Two H.S.

Birmingham City Sanatorium and Anti-Tuberculosis Centre.—Sen. Asst. M.O. £400.

Birmingham and Midland Hospital for Skin and Urinary Diseases, John Bright-street.—Medical man. 26 guineas. Also Anæsthetist. £20.

Bristol Education Committee.—School M.O. £500.

Bristol Royal Infirmary.—H.P. and H.S. £120.

Charing Cross Hospital, W.C.—Res. Cas. H.S.

Dorset County Council.—Female Asst. M.O. £350.

East Ham County Borough Education Committee.—Female Temp. Asst. School M.O. £4.0.

Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—Female H.P and Obstet. Asst. £50. Also Female Clin. Assts.

Great Northern Central Hospital, Holloway, N.—Res. M.O. £300.

Kensington and Fulham General Hospital, Earl's Court, S.W.—Res. M.O. £250.

Leicester Corporation Isolation Hospital, Groby-road.—Jun. Res. M.O. £250.

Liverpool, Royal Southern Hospital.—Two H.S. and Cas. O.

Liverpool, Toxteth Park Poor-law Institution and Infirmary.—Asst. Res. M.O. £300.

Manchester Education Committee.—Female Temp. Asst. School M.O. £350.

Metropolitan Hospital, Kingsland-road, E.—H.P. £150.

Metropolitan Hospital Tuberculosis Dispensary, Kingsland-road, E.—Temp. M.O. £5 0.

Much Wenlock, Salop, King Edward VII. Memorial Sanatorium.—Temp. Asst. Med. Supt. £300.

National Hospital for Paralysed and Epileptic, W.C.—Registrar. £100.

Northampton General Hospital.—Jun. H.S. £150.

Plymouth, South Devon and East Cornwall Hospital.—M.O. for Venereal Diseases Department. £500.

Portsmouth Royal Hospital.—H.S. £200.

Queen's Hospital for Children, Bethnal Green, E.—H.S. £100.

Queen Mary's Hospital for the East End, Stratford.—H.S.

Rotherham Hospital.—Jun. H.S. £150.

Royal London Ophthalmic Hospital, City-road, E.C.—Dep. Bacteriologist. £120. Also Refract. Assts. £100.

St. Helens, Lancs, Pilkington Special Orthopædic Hospital.—Res. M.O. £100.

Salford Royal Hospital.—Hon. Surgeon.

Sheffield Royal Infirmary.—Res. S.O. £200.

Shoreditch Infirmary, Hoxton-street, N.—Med. Supt. £600.

Southampton County Borough Isolation Hospital.—Res. M.O. £400.

Sutton, Surrey, Downs Sanatorium.—Temp. Asst. M.O. £350.

Swansea Hospital.—H.S. £250.

Truro, Royal Cornwall Infirmary.—H.S. £150.

Warrington Infirmary and Dispensary.—Sen. and Jun. H.S. £250 and £140.

Whipps Cross War Hospital, Leytonstone, E.—Res. M.O. £1 per day.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Lincoln.

Births, Marriages, and Deaths.

BIRTHS.

BROWN.—On Sept. 5th, at Sheerwater Lodge, West Byfleet, Surrey, the wife of Captain L. Graham Brown, M.C., M.R.C.S. Eng., L.R.C.P. Lond., R.A.M.C., of a daughter.

CATES.—On Sept. 8th, at Laurel Mount, St. Helens, the wife of Joseph Cates, M.D. Lond., D.P.H. Camb., of a daughter.

CLIVE-SMITH.—On Sept. 5th, at Westminster Nursing Home, Chester, the wife of Captain Clive-Smith, R.A.M.C., of a son.

FARQUHARSON.—On Sept. 2nd, at York-place, Baker-street, the wife of Captain W. Farquharson, R.A.M.C., of a daughter.

O'SHEA.—On Sept. 8th, at Campsbourne-road, Hornsey, the wife of H. V. O'Shea, M.B., of a daughter.

PETERS.—On Sept. 7th, at High-street, Petersfield, the wife of Captain Rudolph A. Peters, M.C., M.B., B.C. Camb., R.A.M.C., of a son.

WALL.—On Sept. 3rd, at Lower Baggot-street, Dublin, the wife of Captain H. E. MacMahon Wall, M.R.C.S. Eng., L.R.C.P. Lond., R.A.M.C., of a daughter.

MARRIAGES.

BUCHANAN—HAIR.—On Sept. 6th, at St. Margaret's, Lossiemouth, Morayshire, John Scouler Buchanan, Captain, R.A.M.C., to Edith Margaret, elder daughter of J. H. Hair, Skerry Cliff, Lossiemouth.

DOORLY—BURT.—On Sept. 5th, Captain Arthur R. C. Doorly, M.R.C.S. Eng., L.R.C.P. Lond., R.A.M.C., to Winifred Burt, youngest daughter of Mr. and Mrs. Burt, of Witchampton.

FICKLING—O'CONNELL.—On August 31st, at Holy Trinity Church, Bembridge, Edwin Llewellyn Fickling, Captain, R.A.M.C., M.R.C.S. Eng., L.R.C.P. Lond., to Eileen Dora, only daughter of Mr. and Mrs. H. H. O'Connell, "Wooloomooloo," St. Ronan's-road, Southsea.

MILLER—KELSON.—On Sept. 3rd, at St. Wilfred's, Hayward's Heath, Captain Robert M. Miller, D.S.O., R.A.M.C., L.R.C.P. Lond., to Annie Mortimer, daughter of the late Thomas Mortimer Kelson, Captain, 6th Royal Regiment, and Mrs. Kelson, Birling, Hayward's Heath.

DEATHS.

IRONSIDE.—On Sept. 4th, at 50, Belsize-park, N.W. 3, Robert Adrian Ironside, M.D., aged 65.

MORRIS.—On Sept. 3rd, at his residence, Eaton-place, Brighton, the Rev. Joseph Morris, M.D., aged 75.

PROCTOR.—On August 12th, of wounds, John Proctor, Major, R.A.M.C., M.B., Ch.B. Aberd., of Ballater, Aberdeenshire.

TODD.—On Sept. 3rd, at a nursing home, London, Margaret Todd, M.D. Brux., L.R.C.P. & S. Edin., L.R.F.P.S. Glasg., daughter of the late James Cameron Todd, of Glasgow and Rangoon, aged 59.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

EDITORIAL NOTICE.

In consequence of the pressure on our space and the shortage of paper, the Editor may be compelled to abbreviate communications, as an alternative to their rejection, when time does not allow them to be reconsidered by their authors.

Communications, Letters, &c., to the Editor have been received from—

A.—Mr. C. Andrew, Lond.; Major G. F. Alexander, R.A.M.C.

B.—Capitano Medico Prof. G. Breccia; Mr. W. C. Blaker, Lond.; Miss R. Beszant, New Brighton; Capt. W. Langdon Brown, R.A.M.C.(T.); Dr. G. Barling, Birmingham; Mr. H. Blakeway, Lond.; Mr. G. W. Badgerow, C.M.G., Lond.; Lieut. G. Bousfield, R.A.F.; Mr. J. C. Buchanan, Lond.; Dr. G. Blacker, Lond.; Capt. W. G. Ball, R.A.M.C.(T.).

C.—Lieut.-Col. A. B. Cottell, R.A.M.C. (retd.); Dr. H. P. Cholmeley, Forest Row.; Mr. J. Cabburn, Lond.; Major D. W. Carmalt-Jones, R.A.M.C.(T.)

D.—Department of Scientific and Industrial Research, Lond., Sec. of; Dr. V. Dickinson, Lond.; Capt. F. Dillon, R.A.M.C.

E.—Dr. J. Eyre, Eastbourne; Mr. A. B. Elliott, Abergele.

F.—Mr. J. Ferguson, Stirling; Mr. S. Farrell, Lond.

G.—Dr. D. Graham, Boston; Dr. W. Gordon, Exeter; Lieut.-Col. E. Goodall, R.A.M.C.; Capt. J. A. Glover, R.A.M.C.

H.—Major H. Hemsted, R.A.M.C.; Messrs. Hingley and Roll, Eastbourne; Mr. J. K. Haworth, R.A.M.C.

I.—Incorporated Society of Trained Masseuses, Lond.

K.—Dr. P. Kidd, Lond.

L.—London Hospital Medical College, Sec. of; Dr. T. Lumsden, Lond.; Local Government Board and Scottish Office, Lond.; Messrs. Lea and Febiger, Philadelphia; Dr. R. B. Low, Lond.; London School of Medicine for Women, Asst. Sec. of.

M.—Capt. J. W. Moore, M.R.C., U.S.A.; Messrs. W. Michael and Son, Watford; Medical Research Committee, Lond.; Medical Women's Federation, Lond.; Mr. J. E. R. McDonagh, Lond.; Medico-Political Union, Lond.; Dr. J. C. McWalter; Mr. W. McLachlan, Belmont; Ministry of Munitions of War, Lond.

N.—Mr. J. O. Neuman, Lond.; Dr. J. T. C. Nash, Norwich; National Baby Week Council, Lond., Sec. of.

P.—Miss K. Pilkington, Lond.; Major J. Phillips, R.A.M.C.

R.—Dr. J. W. Russell, Birmingham; Mr. S. C. Ranner, Lond.; Mr. W. Roberts, Tring.

S.—Dr. G. E. Shuttleworth, Lond.; School Dentists' Society, Lond.; Prof. E. H. Starling, C.M.G., Lond.; Miss H. Stawell, Shaftesbury; Dr. J. A. Shaw-Mackenzie, Lond.

T.—Triplex Safety Glass Co., Lond.; Capt. J. G. Thomson R.A.M.C.

W.—Dr. L. A. Weatherly, Bournemouth; Dr. W. H. Wynn, Nevin; Dr. T. S. Wilson, Lond.; Sgt. A. B. Walker; Capt. H. L. Whale, R.A.M.C.(T.); Dr. C. H. Whiteford, Plymouth.

Offices: 423, STRAND, LONDON, W.C. 2.

Notes, Short Comments, and Answers to Correspondents.

A FORGOTTEN PHYSICIAN OF THE SECOND CENTURY.

Samuel, surnamed Schabour, and also Arioch, and mentioned in Jewish literature as Mar Samuel, was born at Nehardea (destroyed by Odenathus in A.D. 259) about A.D. 160. His father, Abba, was an important person there. Physically insignificant, being abnormally short and ill-developed, intellectually Samuel was great. He was educated at Nehardea by Rabbi Leir, a learned man who turned out several famed pupils. Samuel studied and specialised in various branches of learning, but his chief reputation and, indeed, the profession he finally made his own was that of the healing art. As a student he early made such progress in medicine that he was permitted to perform autopsies, and we have records of some of these. There is an account of a decision of his as to how large a piece of skull could safely be removed in case of fracture. He is quoted as stating after examination of an aborted fœtus that it was 41 days old, showing an intimate knowledge of the conformation of the product of conception at various stages. His opinion upon the abnormality termed spina bifida is also upon record. He must have carried out anatomical dissections, because there are extant quotations from his views on the limit of the spinal marrow. He appears to have been cognisant of the lacrymal gland and of the atrophy of which it is susceptible under certain circumstances in advanced age. His treatise upon the pathogenic symptoms following upon abrupt changes of diet is quite modern in thought. All varieties of regimen, he said, are liable to be the starting point of some malady.

For external diseases he sought natural causes for their occurrence and for their fatal termination; so for penetrating sores he accused the air of rendering them incurable. Also for wounds which finally poisoned the system, he said the cause was some virus upon the weapon that had inflicted the injury. In pathology he endeavoured to indicate for each malady the characteristic symptoms: for grave rhinitis, following probably a polypus ulcer, he said it could be detected by the offensive odour proceeding from the nasal organ. Migraine he attributed to excessive solitude and introspection. Magic as a curative he ignored. As to the propriety of attempting cures upon the Sabbath he was entirely favourable. He advocated the use of the speculum in order to ascertain if hæmorrhage proceeded from the vagina or the uterus. He was a great believer in bleeding as a remedy for many ills. Cleanliness was a main feature of his preventive teaching. The hands should be washed at least twice a day to prevent eye affections. He admitted his inability to cure three illnesses: that proceeding from eating green dates, if unripe and sour; the evil consequences of wearing a damp linen waistband as a girdle; and illness caused from going to bed after eating too hearty a meal and taking no exercise. Perhaps he also intended to convey that patients acting so foolishly were unworthy of being given remedial relief.

A SHORT WAY WITH COCKROACHES.

THE *Bulletin* of the Chicago School of Sanitary Instruction has been dealing with domestic pests, the latest issue describing a simple and effective way of ridding premises of these unpleasant arthropods. Commercial sodium fluoride mixed in equal parts with flour is dusted over the runways or applied with a dust-gun or powder-blower.

"The immediate effect will be noticed that the insects will come out of their hiding places, and after rushing about in a frantic manner for a time become paralysed and soon die. The dead or paralysed cockroaches may then be swept up and burned. As a rule premises can be ridden of roaches by this method in 24 to 48 hours."

The same mixture is said to kill caterpillars when fed on foliage that has been dusted with it. The fluorides should be used, however, with care and the inhalation of the dust should, of course, be avoided, as these salts have an injurious action on the human subject. Their use as preservatives in food is legally prohibited in the United States.

A. E. W.—As far as the necessity for sleep is concerned, there appears to be no essential difference between a brain worker and a manual worker. The function of sleep is to renovate the tired tissues, whether brain or muscle. The brain worker, so long as he is awake, uses every muscle in his body, as we know from recent calorimetric investigations, although, of course, in smaller degree than the manual worker. The manual worker's muscles are controlled by cells in the grey matter of the brain, in which it is that the first symptoms of "muscle" fatigue really appear.